FEBRUARY 1959

POWER INDUSTRY

PLANT & POWER SERVICES

In this issue: — over 30 reports of technical developments in plant and power services

Saves $10,000 a year on fuel . . . . page 14

Plant and Power Services Equipment:

TO LEASE — or NOT TO LEASE

That is the question —

answered by Frank Hudik, president, Hudik-Ross, Inc., air conditioning, heating and ventilating contractor . . . page 10

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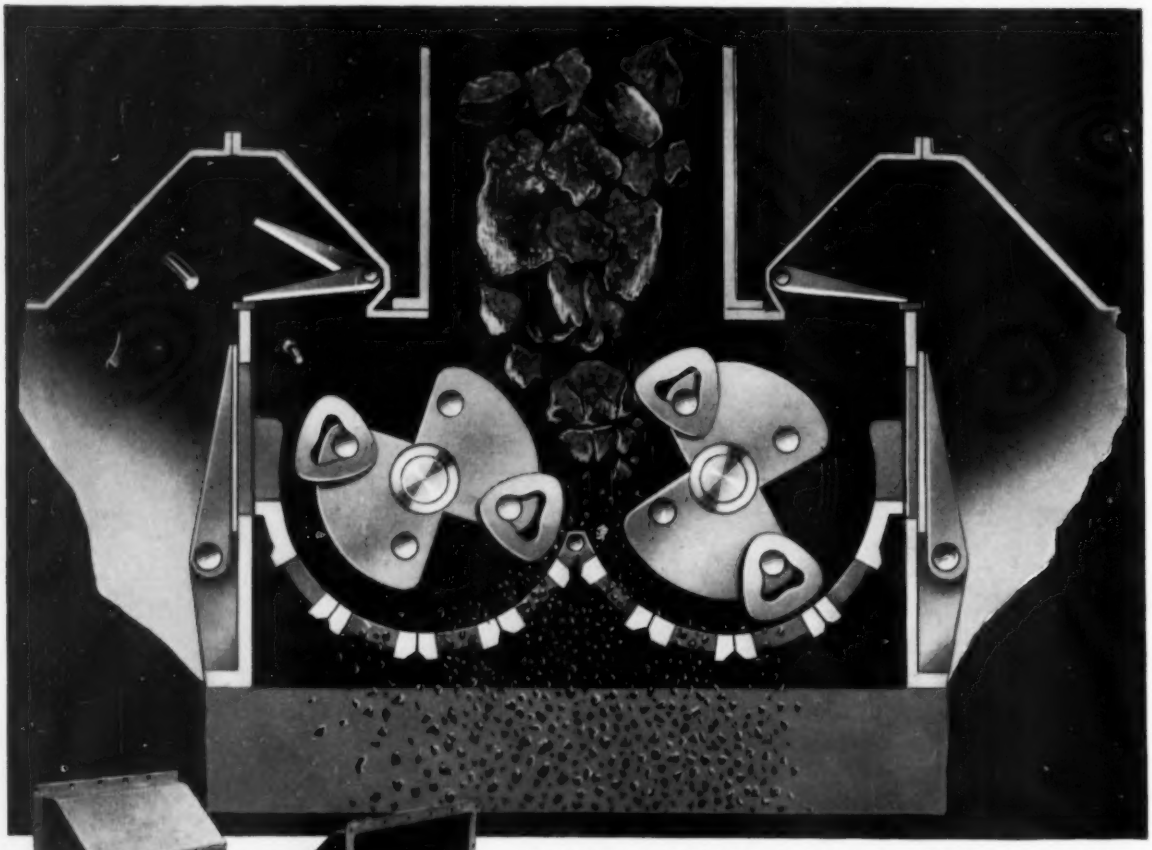
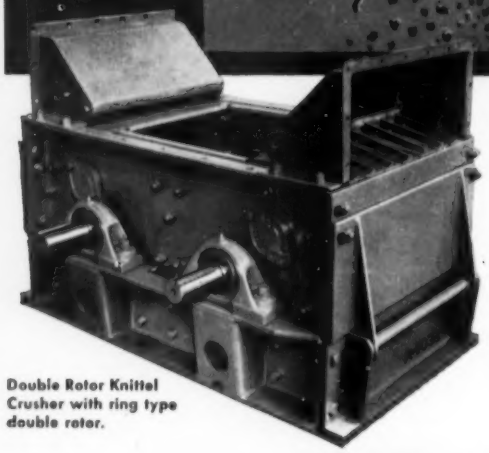
KNITTEL CRUSHER Ring Type with Double Rotor





Double Rotor Knittel Crusher with ring type double rotor.

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WRITE FOR BULLETIN 858

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Circle 9439 opposite covers.

Feb. 12-13: 1959 Solid State Circuits Conference; Philadelphia, Pennsylvania.

Feb. 16-19: Industrial Ventilation Conference; Kellogg Center for Continuing Education, Michigan State University, East Lansing, Mich.

Mar. 1-4: Second National Lighting Exposition, New York Coliseum, New York.

Mar. 17-18: Air and Water Pollution Abatement Conference; Netherlands Hilton Hotel, Cincinnati, Ohio.

Mar. 18-20: 22nd Annual Short Course for Superintendents and Operators of Water Sewerage Systems; Louisiana State University, Baton Rouge 3, La.

Mar. 16-20: National Association of Corrosion Engineers, National Meeting; Sherman Hotel, Chicago, Ill.

Apr. 5-9: Edison Electric Institute Annual Convention; New Orleans, La.

Apr. 6-9: Rural Electric Generating Cooperatives 10th Annual Operating Conference; Hilton Hotel, Albuquerque, N. M.

Apr. 6-10: 1959 Welding Show, Sherman and International 40th Annual Convention; Hotel Amphitheatre, Chicago, Ill.

Apr. 16-30: Engineering, Marine, Welding & Nuclear Energy Exhibition; Olympia, London, Eng.

Apr. 29-May 4: Oil-Heat Institute of America, Inc., Seattle, Wash.

May 5-6: Interdisciplinary Conference on Self-Organizing Systems; Museum of Science and Industry, Chicago, Ill.

May 30-June 5: Fifth World Petroleum Congress; New York, New York.

May 3-6: Air-Conditioning and Refrigeration Institute, Board and Annual Meeting; The Homestead, Hot Springs, Va.

June 7-11: American Society of Heating and Air-Conditioning Engineers, Inc., Semi-Annual Meeting; Vancouver, B. C.

June 17-20: 1959 Engineering Progress Exposition; Hotel Commodore, New York, N. Y.

August 18-21: 1959 Wescon Exhibit; San Francisco Cow Palace, San Francisco, Calif.

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February 1959
VOL. 75 No. 2

POWER INDUSTRY
PLANT & POWER SERVICES

PUTMAN PUBLISHING COMPANY • 111 EAST DELAWARE PLACE • CHICAGO 11, ILLINOIS

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. . . with which are combined INDUSTRIAL POWER and INDUSTRY POWER . . . serves the key men responsible for plant and power services throughout all industry, including utilities, and also in complexes of public institutions, schools, hospitals, etc.

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NBP NATIONAL BUSINESS PUBLICATIONS, INC.

IN THIS ISSUE

9 **Treats nylon waste at 30,000 gph**

Two Chemstrand engineers tell how their company uses submerged combustion to treat nylon wastes at fantastically high rates

10 **Why lease plant and power services equipment?**

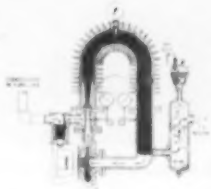
Heating, ventilating and air conditioning contractor Frank Hudik discusses the facts on l. .ing equipment

12 **Eliminates hot water bottleneck**

Sea and Ski tripled its production by coming up with an efficient combination of steam generator and injection water heater to handle all hot water needs

14 **Saves $10,000 a year on fuel**

By using a closed-loop, high-pressure condensate return system on its paper machines, Crown Paperboard has brought its fuel bill way down



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MONTHLY FEATURES

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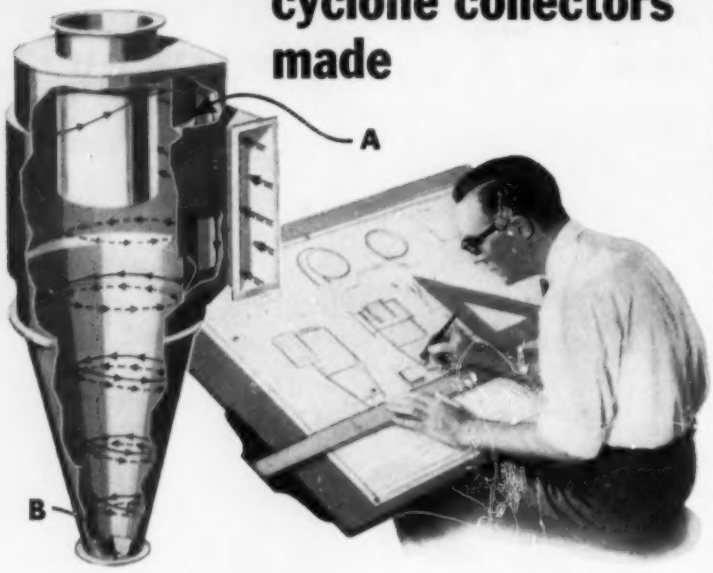

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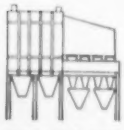
PRECIPITATOR-CYCLONE COMBINATIONS

Buell Cyclones before installation at a major plant.

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Circle 9440 opposite covers.

REPORTS IN BRIEF

U.S. electric generating capacity increased 12 percent in 1958

Continuing to expand at a record rate, America's electric power industry reached a total generating capability of 146 million kw in 1958 — an increase of 12% over 1957.

The total capacity addition installed and scheduled for 1958 was about 15 million kw — almost double that put into operation in 1957 and exceeding the previous high record of 1955 by some 3 million kw.

At the end of 1958, gross margin (the difference between maximum generating capability and peak demand) was estimated at 29.6 million kw or 25.5% of the peak load. Although this margin is larger than anticipated (because of some production cutbacks during the year), long-range load growth previously estimated at 7.6% a year for the period 1957 — 1961 is expected to continue at the same average rate.

Total generating capability now forecast for the end of 1961 is 180 million kw, representing an average annual increase from the end of 1956 of 8%. Power plant projects to provide this increase are now definitely scheduled.

A breakdown on these projects is as follows: Of the 485 generating units scheduled in present five-year program, 333 are thermal, totaling over 42.6 million kw. The balance is made up by 152 hydraulic units with a total capacity of over 9.5 million kw. The overall program, running beyond 1962, calls for a total of more than 52 million kw — about 18% hydro and 82% thermal.

The above figures were the result of a survey made by the Edison Electric Institute. That same survey shows that atomic-electric power projects (still largely developmental) are contributing some 71,000 kw to the national power supply.

Other projects under construction or contract, but not yet in operation, will bring the total to approximately 850,000 kw more by 1962. Another three-quarters of a million kw of atomic-electric capacity still is in the planning stage.

Soviet electric power

Last August, a ten-man delegation representing the American electrical industry toured the Soviet Union to view their electric industry. The tour was conducted under the auspices of the Edison Electric Institute and the Association of Edison Illuminating Companies by arrangement with US State Dept. A 30-page report of the tour has been published by the Edison Electric Institute, 750 Third Ave., New York 17, N. Y.

Probably the most interesting fact to come out of the tour is that the Soviet Union's total electric generating capacity at the present time is less than the new capacity to be installed in the US within the next four years.

The total installed capacity in the USSR was reported by the Soviet Power Ministry to be 48.3 million kw in 1957. The US will install over 50 million kw during 1958, 1959, 1960 and 1961.

During 1953 alone, the US will install over 15 million kw of generating capacity (See story above) or almost one-third the total installed capacity in the USSR.

The Russians plan to add an average of about 7½ million kw capacity a year to

965. During this same period, he US will be growing at an verage of about 13 million w per year. In kilowatt- ours, the relative figures for he USSR and the US will each 500 billion and 1250 bil- ion kilowatt hours respective- y by 1965. In general the del- gation has noted that in the ast the Russians had consist- ntly fallen short of their oals.

Of the new capacity plan in he Soviet Union, about 85% s expected to be in thermal tations fueled by coal, oil or as, and 15% in hydro-electric nstallations. This is about in he same proportion as the United States (See page 4).

The effect of nuclear power n the overall Soviet power icture is expected to be neg- gible.

on exchange book

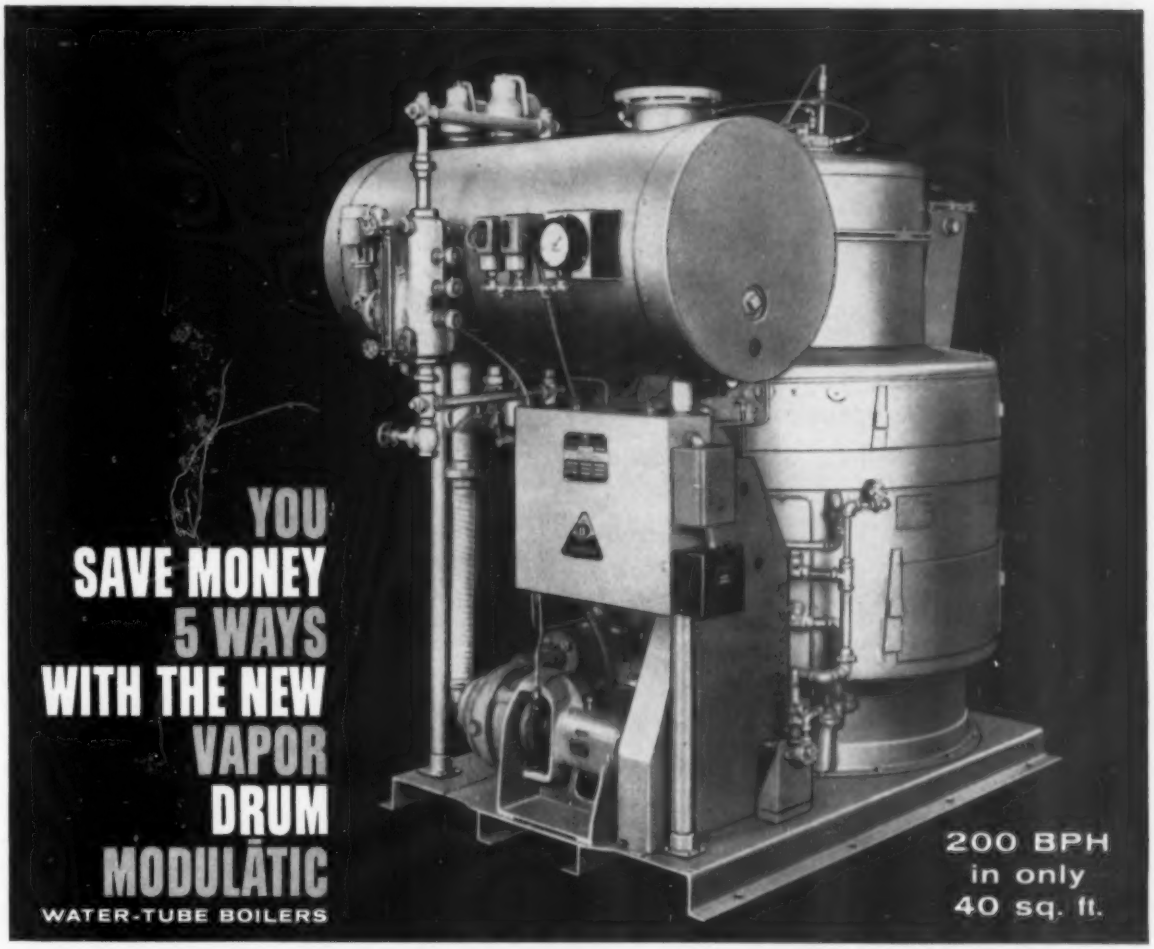
Publication of a new book n ion exchange, its principles, pplications, test procedures nd laboratory techniques has een announced by The Dow hemical Company.

The bound 75-page volume titled, "Dowex: ION Ex- hange." It is intended for use y process engineers, and the aboratory scientist seeking eady reference on ion ex- hange technology. The book full of tables, graphs, and rawings.

A section is also devoted to escription of types and prop- rties of ion exchange resins. lso included are ion exclu- on and ion retardation. haracteristics and physical roperties of resin beads are lso described.

This new book is provided help established ion ex- hange users and those who nd the use of ion exchange rinciples a solution to pro- uction problems.

Copies of the book are vailable to company depart- ental libraries. Inquiries hould be directed to Engi- eering Chemicals Sales, The low Chemical Company, Mid- nd, Mich.



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Entire unit is covered by 1-year materials and workmanship warranty. 5-year tube warranty includes $50 labor allowance.

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because of Vapor Drum Modulātic flexibility. Multiple-unit installations meet widely-varying steam or hot-water requirements. Single, coordinating control turns individual units off or on as demand varies—ends the inefficiency of idling larger boilers. (Controls are standard with easily maintained or replaceable parts.) Unit sizes: 20 to 200 hp; 0-15, 5-150 psi steam pressure; 670,000 to 6,690,000 btu/hr; unlimited hot water.

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★ Engineered for uniform design and easy installation
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★ No sharp edges to damage cables
★ Complete interchangeability

Now, for the first time, two types of cable trays, one a ladder type and the other a basket type, are available to be used INTERCHANGEABLY at any given location, depending on the type and weight of the cables to be suspended. The advantages of each type tray can thus be used to the fullest extent. Globetray, the ladder type, is intended for use where festooning is not a problem, while Cable-Strut, the basket type, is intended for the support of communication wire, instrument tubing and control cables in automation applications.

These two cable trays have been thoroughly field tested in hundreds of large industrial installations, in new plant construction, in power plants, in modernization, and for power distribution in all types of manufacturing processes. A new catalog, just off the press, gives full information and installation techniques. Ask for your FREE copy today.

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Circle 9442 opposite covers.

The price of progress?

At an ASME meeting held in New York the first week of December, a well known industrialist charged that life today resembles life in an ant hill.

"The freedom, man set out to gain by the conquest of matter, becomes more and more an illusion because each further step leads him irrevocably into deeper servitude to his new masters: technical progress and materialistic prosperity." This was the statement by Walter Boveri, president of the Brown Boveri Corporation of Switzerland.

The machines which man has created have progressed, but not man himself. He describes the modern human being as nothing more than a small cog in the soulless machinery of technical progress. The final purpose of all research should never be technical progress, but exclusively and always the progress of man.

He proposes the following plan by which the western world may reach this goal:

A change in today's way of life is necessary, because the present generation is losing the toughness and courage which enabled its forefathers to create the world we live in today.

Technology today does not create to fill a demand. It creates sometimes useless luxuries for which an artificial demand is then drummed up.

By having the arms race, satellite race, and the ICBM race between Russia and the US, we have lost sight of the goal of humanity which is creative thought and imagination. These mature only by effort and exertion and eventually find their way to growth and development.

Intellectual versatility is obtained only by strict discipline of the brain. By endurance and deep independent thought, not only on specialized subjects, but on all the great riddles enveloping our life.

Man must learn to seek — through the arts, philosophy and religion — the "deeper meaning of life that can consist neither in technica achievements nor in the fur therance of purely materialis tic aims."

Technical progress in th past has given and can con tinue to give the world free dom. "This freedom can b the source of great achieve ment, which will always grar us superiority over any com munistic system," says M: Boveri.

The task of our preser generation is to make th supreme effort to ensure tha the generation succeeding provided with the right knowl edge of freedom and a broa education "with a training i mental discipline and endur ance based on sound ethica principles."

Smog research

Dr. W. L. Faith, managin director of the independer Air Pollution Foundatio thinks that two more years intensive scientific researc will solve LA's smog problen At that time private industr can take over and produc workable, economic contro for auto exhaust and thereb eliminate smog.

Faith emphasized in his re port that smog in LA an other population centers o the West Coast is not th same kind of air pollution that troubling most othe metropolitan areas of th country.

He also cautioned again hopes that the Federal Gov ernment will be of any assis ance in ridding the West Coa of its "photochemical" smo

The tendency is to foist th job on the Federal Goverr ment. These suggestions a based on the notion that device that will settle LA problem will be equally ap plicable in other areas. This questionable.

The low-inversion, low wind, intense-sunshine regir necessary to develop eye irr tation from auto exhaust se dom occurs in areas othe than the West Coast.

The most common air pollu tion complaints elsewhere a visible smoke and disagre

ble odor of exhaust, particularly from buses and trucks; potential hazards of carbon monoxide and nitrogen oxides, and suspicion that auto exhaust contains compounds that may induce lung cancer.

These complaints pose exhaust control problems that are dissimilar to LA's problem in dealing with photochemical smog — LA's eye irritation, high ozone concentrations, blurred visibility and plant damage. Accordingly the solution that will finally be accepted in LA and for the West Coast may not apply in other communities.

Keystone of the Foundation's immediate basic research plans is the relationship between the nitric oxide in auto exhaust and certain olefins in exhaust — neither of which, Faith emphasized, is directly related to the gasoline used in an auto. Most of the work will be done in the Foundation's smog chamber at the Stanford Research Institute facility in South Pasadena.

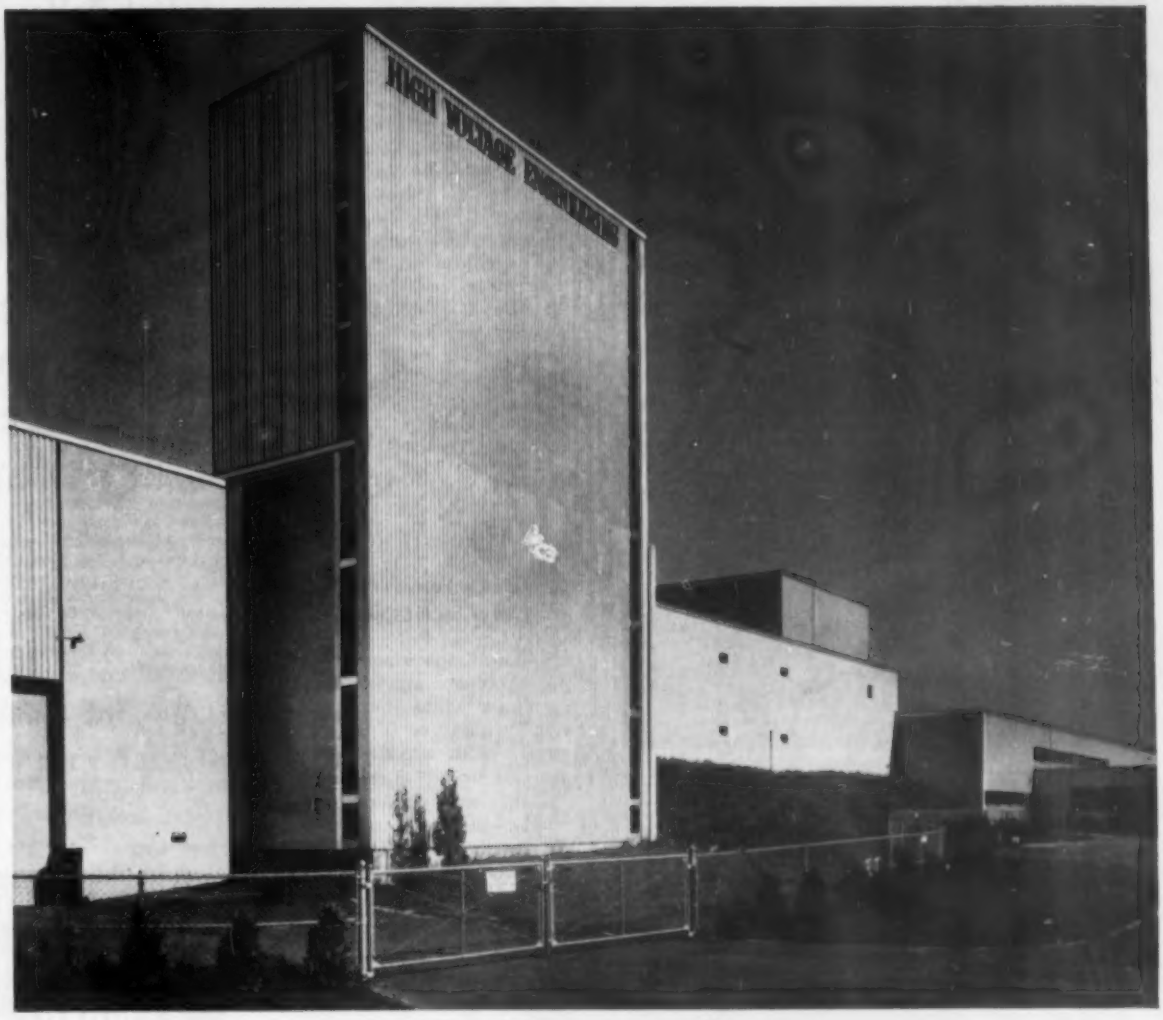
ew welding symbols

The first major change in welding symbols in recent years has been announced by the American Welding Society. The new standard contains many additions and improvements.

Due to the increased use of welding, the number of welding symbols had to be doubled. New processes have been developed and new types of welds adopted, necessitating additional symbols for adequate explanation.

Some of the new symbols are for: spot and seam welds made by arc welding; for welds used in aircraft, guided missile and automotive work; and for the types of welds used in structural steel fabrication, reinforced concrete work and the like.

Tables and charts are provided. The system covers 37 commercially used welding processes and also provides means for indicating: automatic welding, machine weld-



Partial View of the new plant on a 50-acre tract.

Architect: Carleton R. Richmond, Jr.; Supervising engineers: Stressenger, Adams, Maguire & Reidy; General contractor: Aberthaw Construction Co.; Electrical contractor: M. B. Foster Electric Co.

Another electrical manufacturer selected SORGEL dry-type transformers

for the operation of their plant

The HIGH VOLTAGE ENGINEERING COMPANY, in Burlington, Mass., the world's largest manufacturer of atom smashers, learned about the advantages of SORGEL dry-type transformers during an application with their product, which, on account of its nature, required the *best* transformers.

Being in a position to judge the quality of the transformers, they, like so many other electrical manufacturers, also selected SORGEL dry-type transformers for their own plant.

Complete line of dry-type transformers for every purpose

¼ Kva to 10,000 Kva — 120 to 15,000 volts

Quietest operation and high efficiency

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Over 40 years' experience in the development, manufacturing and application of transformers

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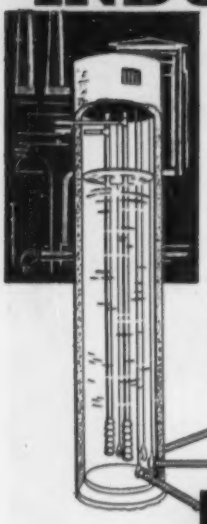
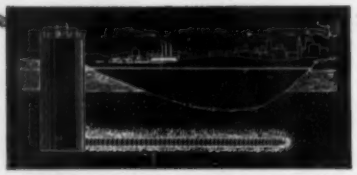
INDUSTRIAL water... a job for the RANNEY METHOD



Conventional Collector. Proven by industries the world over, the collector that yields more naturally filtered water, with less equipment, less personnel, and fewer pumps than any other conventional collector.



Infiltration Gallery. The gallery, engineered by Ranney, provides industry a low cost water supply. The gallery provides large quantities of clear non-turbid water in a revolutionary yet economical way, and it requires no maintenance.

A Few Industries Now Using the Ranney Method

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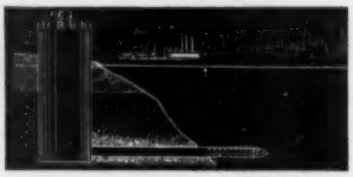
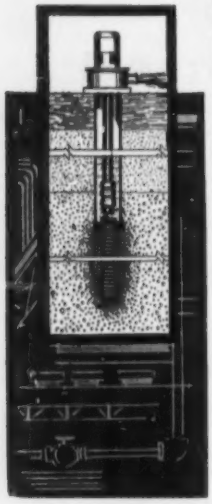


Ranney Intake. The Ranney Intake, already has proven that plants and factories can obtain surface water both efficiently and economically. The Ranney Intake can usually fit into the design of your engineering department or consultant.



Ranney Vertube. Small industry and low volume users can now have a natural gravel vertical water well at low cost. Engineered with the same Ranney precision that has made their method a must for industry.

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Circle 9444 opposite covers.

REPORTS IN BRIEF

ing, manual welding, and semi-automatic welding.

The Chart of Welding Symbols has been redesigned to incorporate the new developments. The drawings, diagrams and text are self-explanatory and easy to read.

The charts are prepared in two sizes: one for wall use listed at $1.50 and the other, a smaller replica is 50c. The booklet lists at $3. Copies of these may be obtained from Department T., American Welding Society, 33 W. 39th St., New York 18, N.Y.

Space age comes up with new insulation

Difficult space-age insulating problems may be solved by a new white fibrous material, which combines light weight with excellent resistance to heat.

Called fibrous potassium titanate, the new product is composed of a compact mass of crystalline fibers which due to their fineness give it a talc-like feel. Because of the small diameter (less than 1/25,000 of an inch) and high reflectance of the fibers, the new insulating material blocks heat penetration by scattering incoming infrared rays.

Fibrous potassium titanate appears best suited for insulating applications where space and weight are critical. It is about twice as effective on volume basis as any known insulating material.

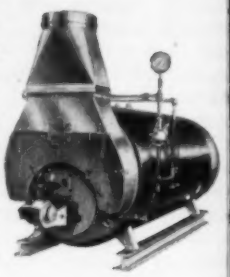
Besides space-age uses, other suggested applications include: uses for electrical and acoustical insulation, reflective shielding for heating units and ovens, gaskets and packing, filters, fire blankets and protective clothing, high temperature paints or coatings, high temperature cement and caulking, paper filler and plastic reinforcement.

Developed by the Du Pont Company, fibrous potassium titanate has almost four times the insulating value of commercial firebrick at comparable temperatures with one-twelfth the weight.

Leffel Boilers Pass The Acid Test:

"... we have been in the boiler business for nearly fifty years, and the only repair work we have ever done on a Leffel Scotch Marine Boiler has been due to human failing, and not to mechanical failure. The Leffel Scotch Marine Boiler is without a doubt the strongest and most trouble-free boiler built."

Mr. J. J. Bower, President
J. J. Bower Company, Inc.
Roanoke, Va.



No man is in a better position to judge boilers than the man who services and repairs all types and makes. It pays to listen to a man like J. J. Bower for his words are backed by nearly a half-century of experience. In the brief statement above, Mr. Bower cuts away all the claims and promises of most of today's boiler advertising and tells you why *you* should rely on Leffel boilers for your steam requirements.

For more details on why you can count on rugged, reliable Leffel boilers for long life and dependable service, write today for your free copy of Bulletin 236.

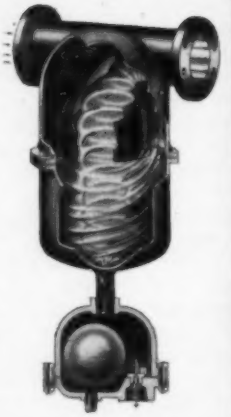
THE JAMES LEFFEL & COMPANY
Dept. I
SPRINGFIELD, OHIO

Circle 9445 opposite covers.

New Design Assures Maximum Entrainment Removal With Low Cost "T" Separator

Redesigned annular passage increases centrifugal force. Separated moisture, oil and solids travel outer wall to lower collecting chamber. Large diameter, high level outlet reduces velocity, eliminates entrainment problems. Screwed ends ½" thru 3". 125 lbs. flanged ends 2½" thru 8". Low cost in-line installation.

Combined with No. 90AC automatic drain trap to prevent loss of steam, air or gas provides most efficient and economical separator-drain combination available.



WRITE FOR BULLETIN TB-541-B

WRIGHT-AUSTIN COMPANY
3245 WIGHT STREET • DETROIT 7, MICH.

Circle 9446 opposite covers.

FEBRUARY 1959
VOL. 73 NO. 2
POWER PLANT & POWER SERVICES INDUSTRY

Deciding to enlarge its nylon plant, Chemstrand Corporation found themselves faced with an almost insurmountable plant service problem — that of an adequate waste disposal system. But the system developed through rigorous lab and pilot plant studies resulted in a disposal plant that . . .

TREATS NYLON WASTE — at 30,000 gph

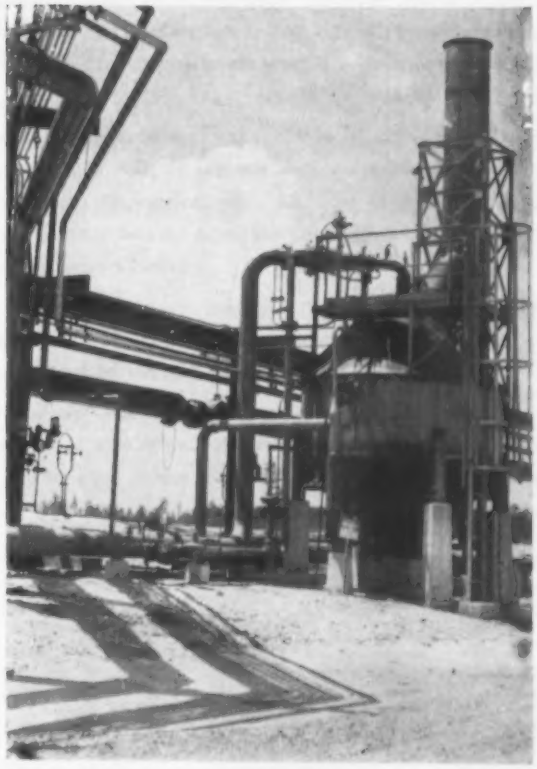
— with "submerged" combustion

E. D. REMY, Quality Control Supervisor
D. T. LAURIA, Sanitary Engineer
The Chemstrand Corporation,
Pensacola, Florida

HOW SUBMERGED COMBUSTION WORKS

Submerged combustion is the burning of a gaseous fuel below the surface of a liquid. This is generally accomplished by submerging the combustion chamber (purged of liquid) in the liquid.

Compressed air and fuel is injected into the burner, burned, and the products of combustion pass upward through body of liquid, heating it. They are quickly cooled to the temperature of liquid, with the result that good heat transfer is obtained.



Important phase of nylon plant's waste disposal system is 1600-gal capacity submerged combustion unit. Equipment can process 125 gal waste per min

Problem: When Chemstrand Corporation decided to expand its nylon plant at Pensacola, Florida, a few years ago, engineers knew that existing waste treatment facilities would no longer be adequate. Nylon output was to be upped from 50 million to 114 million lb per yr — a boost of almost 130%.

Prior to plant expansion, conventional treatment and control through retention lagoons was sufficient to hold plant effluent within safe river assimilation limits. With plant expansion, however, process waste volume would be increased to such an extent that safe assimilation in the nearby Escambia River could no longer be assured. A complete analysis of the situation had to be made, and more efficient waste treatment methods had to be instigated.

Almost 90% of waste emanating from plant comes from the manufacture of adipic acid. This is made up of two liquid streams: Stream No. 1, about half of the waste, comes from the oxidation of cyclohexane, involved in the process. The other half, stream No. 2, is produced in a second oxidation step.

Solution: The first action taken was to determine the exact degree of reduction required to hold treated effluent within minimum safe river assimilation limits. This would then be the true design basis for any new waste treatment plant.

From a statistical analysis of past records, it was found that river flow exceeded 600 cfs 99% of the time. Critical oxygen concentrations occurred during dry summer months, but never went below 5.0 ppm. Since the State of Florida requires that a DO (dissolved oxygen) concentration of 3.5 ppm be maintained at all times, minimum oxygen flow available for the assimilation of organic waste is about 5000 lb per day.

Retention time of Chemstrand waste in the river before emptying into Escambia Bay is less than 1 day, which is equivalent to oxidation of about 25% of the 5 day BOD. This means that a maximum of 20,000 lb of BOD_5 may be discharged during critical dry summer periods without hazard.

Waste production at expanded manufacturing rates is set by waste strength and plant production rates and is equal to about 50,000 ppm BOD_5. For design purposes this figure was increased to

To page 16

TO LEASE

Why Lease Rather Than Buy?

FRANK HUDIK, President, Hudik-Ross, Inc.

As Mr. Hudik states in this article, companies who lease equipment generally do so "not because they have to but because they want to."

First of all, leasing equipment offers the lessee many advantages. The acquisition of new equipment by this method frees capital for other purposes. More important — definite tax advantages are available under leasing arrangements.

Today, a company can lease almost any type of equipment. A good example of what can be leased in the way of plant and power services equipment is offered by Mr. Hudik's own company. His concern will lease and install entire heating, air conditioning or ventilating systems for a base period of two to five years, with unlimited renewal periods.

Regardless of how attractive leasing may look, its total cost is slightly higher than the cost of outright purchases. Also, only rental payments under a bona fide lease agreement may be deducted for tax purposes.

When you consider the acquisition of new equipment, take a good look at the possibility of leasing. However, be sure to view both sides of the story and weigh each and every factor for getting the most out of your money.

THE leasing of equipment for industrial purposes, practically unheard of a decade ago, is today a booming business.

A recent published survey, covering 1837 companies from coast to coast, indicates that in 1950 only seventeen of these firms were leasing some equipment. By 1957, 89 were leasing equipment. This year, 833 of the companies reported that they are considering leasing in the future.

In terms of dollar volume, equipment leasing has grown from virtually nothing ten years ago to a point where it is now approaching the $200 million-dollar-a-year mark. Within five years, it is estimated that the value of equipment leased will reach a billion dollars a year.

These figures assume even greater significance when it is considered that the survey specifically excluded the leasing of cars, trucks and real estate and any equipment rented for less than three years.

Why Lease?

Companies who lease equipment generally do so not because they have to but because they want to. Although buying may be cheaper, many firms find leasing is more profitable. This is true for several reasons. Leasing allows working capital to keep working. It provides for the availability of equipment without the investment of capital.

Most companies can make the best use of capital in their daily business operations for such activities as research and development, expanding inventory, promoting sales, increasing employee staff and financing receivables. While the total cost of leasing is slightly higher than the cost of outright purchase, the profits produced by turning over this working capital several times can far exceed this additional cost.

Leasing may give important and significant tax advantages. Lease costs are tax deductible as an operating expense. When leasing, a company pays for the use of equipment out of current income before taxes, rather than profit after taxes.

It is interesting to note that

In 1939, **Frank Hudik** and his father opened a small shop in a garage behind his home with a working capital of $60.00. In August of this year, the company opened a new 2-story air conditioned plant and office building in Hackensack, N. J., which Mr. Hudik bought for his rapidly expanding business.

The company also has an office in New York City, and the firm now employs over 100 people. Hudik-Ross prides itself on the fact that it is one of the few fully integrated mechanical contracting organizations which does all of its own installation and fabrication, and does not sub-contract any of the functions involved in air conditioning, heating and ventilating work.

In its new building the company maintains, under one roof, its own steamfitting, refrigeration, service and engineering division as well as a complete sheet metal and fabrication shop.

Hudik-Ross has done work for some of the largest industrial, commercial and institutional organizations in the East. It has installed mechanical contracting equipment for Curtiss-Wright Aviation, Bendix Aviation, Ford, Air Reduction, RCA, and many others.

In the commercial field, its clients have included Food Fair, Grand Union, Woolworth, W. T. Grant, J. C. Penney and A.&P. Hospitals, schools, banks, churches are among the institutions for whom they have done installations. They have also done considerable work for the Port of New York Authority.

— OR NOT TO LEASE

he Internal Revenue Service Ruling #55-540 states: "A significant motive for leasing may, in some cases be the tax advantage which might result because of different timing of the deductions for rent, as compared to depreciation."

Speeds up Expansion

Under a leasing plan, customers can enjoy the benefits of new equipment immediately. Delay in installation of new facilities, for example, can mean lost profits, through competitive disadvantage, poor working efficiency, and costly errors traceable to physical discomfort or other factors.

Leasing allows continued expansion, by reducing the drain on working capital. For example, assume that an organization is contemplating a $200,000 expansion project of which $100,000 represents the cost of air conditioning, heating and ventilating. Use of a leasing plan permits the project to proceed when only half the normal capital requirements are available for outlay. The next $100,000 of expansion capital can be then devoted to other expansion needs.

Leasing does not effect bank lines of credit and may in fact be used as a supplementary form of credit. Because future lease payments are not shown as a long term liability, leasing results in a cleaner balance sheet, which may be very important to some corporations.

There are no compensating bank balances to maintain as is required in the terms of certain types of bank loans. Banks usually finance only about 75% of the cost of a purchased item, the remainder having to be paid at once in cash by the buyer. As a rule, leasing plans cover the entire cost.

The carrying costs under a leasing plan are, in many cases, less than those under a conditional sales contract or repayment of a bank loan. The term of the lease is usually longer than the term of a conditional sales contract or a commercial bank loan. This, the cost of using the equipment is divided into smaller portions, reducing the drain on the current cash position.

Highly competitive businesses, which must keep up with the latest improvements and advantages provided by new equipment or increased comfort conditions, are permitted to acquire these advantages without capital investment.

In highly seasonal businesses, the availability of cash or bank credit is important. During peak seasons many of these businesses like to keep their lines of credit open. Leasing provides them with benefits without affecting their borrowing capacity.

In the past, fleets of trucks, heavy manufacturing equipment and even skyscrapers have been leased. Today, we find broad new applications of the leasing principle.

Our own firm, for example, will install complete air conditioning, heating and ventilating systems in new or existing buildings on a lease basis. While small, packaged air conditioning units have been available under lease in the past, this marks the first time that entire heating and ventilating systems including piping, sheet metal and electrical work, as well as complete central cooling systems, are being leased.

What Kind of Terms

Leasing terms vary. The Hudik-Ross Leasing Plan provides for a base period of from two to five years, with unlimited renewal periods. The lease involves no initial cash outlay.

A five year lease plan for a $100,000 mechanical installation would call for a rental of about $2000 a month, the first payment to be made upon completion of the job. Upon expiration of the agreement, the owner may renew the lease on a year-to-year basis at an annual rental amounting to five percent of the original contract price, or, in this instance, $5000.

After the initial leasing period, the owner may request an option to purchase the equipment. The purchase price is set at ten percent of the original cost of the installation, where that cost was over $10,000. For smaller systems, the price is 12 percent of the original cost.

The monthly rental is based on three factors: the cost of the installation, the length of the lease and the credit rating of the lessee. ■

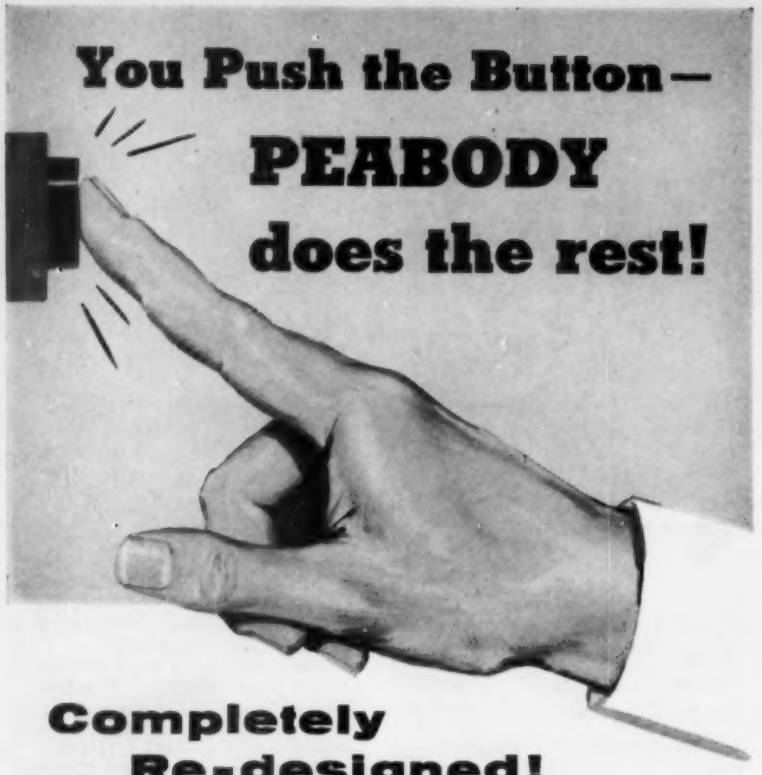
How Leasing Works

Table shows typical monthly payment factor in terms of dollars per month per $1000 of total net cost:

Cost of Installation	Mos.	CREDIT RATING AAA-1	C-2 or Better	Below C-2
$1000 to	24:	$46.20	$46.70	$47.20
$10,000	36:	$32.30	$32.75	$33.25
$10,000 to	24:	$46.00	$46.50	$47.50
$30,000	36:	$32.10	$32.60	$33.60
$30,000	24:	$45.90	$46.00	....
or Over	36:	$31.10	$32.10	....
	60:	$20.10	$22.50	....

Example: If a lessee is rated B+ in Dun & Bradstreet, and the total contract price is $12,000, the monthly payment factor would be found in the second row, in the column headed C-2 or Better.

For a two year lease, the monthly rental therefore would be $46.50 per $1000; and for a three year lease, it would be $32.60 per $1000. In the case of a $12,000 installation under terms of a three-year lease, the monthly payments would be $32.60 x 12 (Thousand Dollars) = $391.20 per month, or 36 x $391.20 = $14,083.20, total cost for three years.



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The Peabody PK-54 Fuel Burner Automatically—

- Recirculates hot oil before start-up
- Purges the furnace before start-up
- Proves ignition before start-up
- Operates quietly
- Burns oil or gas
- Follows the load demand
- Maintains efficient combustion at all loads
- Shuts down if load ceases
- Purges furnace after shut-down
- Relights when load resumes, *after* satisfying all safety requirements
- Shuts down and *locks out* on:

Power failure • Ignitor failure • Main flame failure • Combustion air failure • Atomizing steam failure • Excessive fuel pressure • Deficient fuel pressure • Deficient oil temperature • Any preselected operating factor

This safe, efficient, dependable unit provides exactly what you need for your plant.

Write today for new bulletin 430-B.

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B-361 *PEABODY LIMITED • LONDON, S.W 1, ENGLAND*

Circle 9447 opposite covers.

Fifteen-hp package steam generator in combination with injection water heater has enabled Sea and Ski to double its production

Not enough hot water put Sea and Ski's production schedule into "hot water." Use of steam generator in combination with injection hot water heater . . .

Eliminates Hot Water Triples Production Output

GEORGE MICHAEL
Managing Editor
with **IRWIN ROLLEY**
Production Manager
Sea and Ski
San Francisco, Calif.

Problem: Inadequate production of hot water formed a bottleneck which limited output of Sea and Ski lotion — in fact, kept it way below demand.

Increased sales of the sun tan lotion, and other cosmetics manufactured by Sea and Ski in its South San Francisco plant, plus the development of a new line, compounded this entire plant service problem.

An attempt was made to meet the hot water needs — 8 gal per minute at 168°F — with a big gas jet. The best that could be produced in this fashion was enough hot water to produce a maximum daily output (gallons of product "out the door") of 750 gallons.

In addition, operation requirements called for equipment that would hold up under operation for 8 or 9 hours daily, and for 5 and sometimes 6 days a week. Compactness was a necessity since no additional floor space could be spared.

Fast firing ability and automatic operation were additional factors to be considered, since full-time services of an engineer were considered unnecessary.

Solution: In shopping around for equipment to meet the sorely taxed facilities, management was quick to note that a coil flash-type boiler package unit was what they were looking for. Besides space saving, such equipment would cut down on production time since it could get up to operating pressures within minutes.

Ease of operation with additional savings was another factor.

Final choice led to a package steam generator in combination with an instantaneous injection water heater. This combination would satisfy both the steam and hot water needs.

Steam generator contains

For three years hot water generator has operated without demanding a bit of attention. It was just started up and that was that

ottleneck –

ho fired vessels, headers or drums. It is rated at 15 hp and s a high-pressure gas-fired nit.

In addition to general heating, the steam and hot water s used in formulating and in leaning units and piping between runs.

Results: After installation, roduction line could turn out riple the former maximum olume — an increase from 50 to 2250 gallons. Indications re that this figure could asily be exceeded if needed.

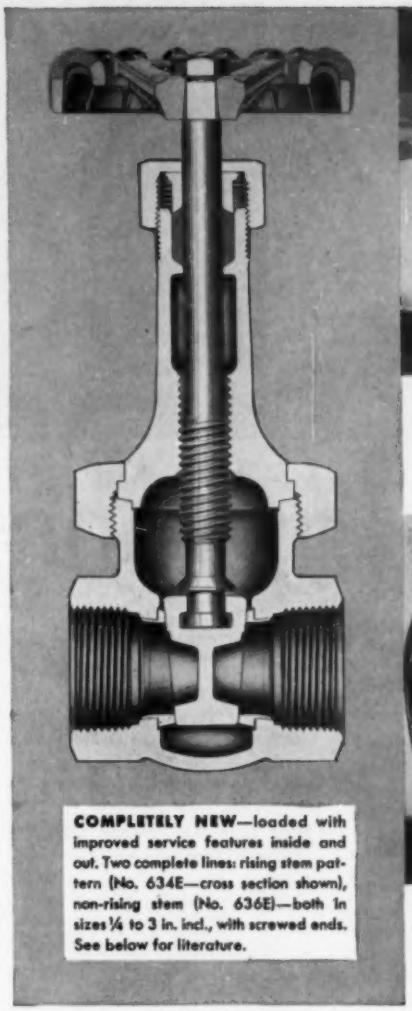
The installation was made n January, 1956. To date, it as not demanded a bit of ttention. The company just tarted it up and that was that.

(RG15-2 package steam enerator is manufactured by layton Manufacturing Co., ept. PI, Box 550, El Monte, alif.)

ircle 9448 opposite covers.

(Instantaneous injection water heater is manufactured by ick Mfg. Co., Dept. PI, Second and Oak Sts., West Bend, Visconsin.)

ircle 9449 opposite covers.



COMPLETELY NEW—loaded with improved service features inside and out. Two complete lines: rising stem pattern (No. 634E—cross section shown), non-rising stem (No. 636E)—both in sizes ¼ to 3 in. incl., with screwed ends. See below for literature.

NEW CYLINDRICAL BODY SHAPE—a proven design on high-pressure steel valves—increases strength without added bulk, distributes pressure load uniformly, resists distortion and leakage at seats.

NEW, STRONGER HEX ENDS, better integrated with body, eliminate sharp contours, give entire valve more rigidity under line strains. Wider hex faces allow firmer wrench grip for easier installation. Marring less likely.

NEW, EXPANDED-TYPE BODY RINGS insure long, tight-seating service life. They're rolled in, can't work loose. Shoulder at bottom of end threads restrains excessive entry of pipe against possible seat damage.

NEW EXELLOY, 12% chromium steel body rings give a hard bearing surface, highly resistant to wear, indentation, scoring and foreign matter damage. Easily replaced bronze disc takes the brunt of normal wear.

New design for tough service...easy maintenance

300-Pound Wedge Disc Bronze Gate Valves

Rising Stem and Non-Rising Stem Patterns

A new body shape that distributes greater strength uniformly against internal stresses and external strains . . . better integrated hex ends, huskier and wider, that add to body rigidity and give a firmer wrench grip . . . new rolled-in, high wear-resisting alloy body rings that don't work loose . . . easily renewed wedge disc—these are typical important features of new Crane bronze gate valves.

On your toughest services, these valves assure ultimate durability . . . new ease of application . . . low-cost repairability. And they're priced no higher than ordinary 300-pound integral seat bronze valves.

Easy to Repair—The Disc Takes the Wear

After long, hard service the hard Exelloy (12% chromium) body rings show no appreciable wear. Normal seating wear is taken by the bronze disc. When needed, a new disc, easily slipped onto stem, provides a practically new, tight-seating valve.

Circular Gives The Facts

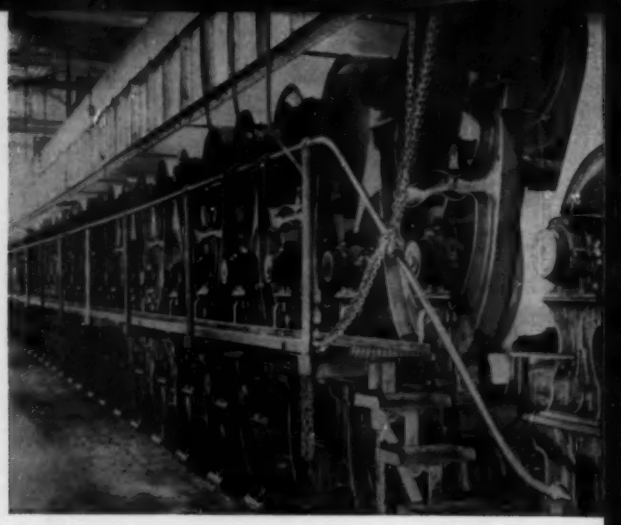
For complete technical data on both rising stem and non-rising stem patterns . . . size listing, etc., get Circular AD-2340 from your Crane Representative, or by writing to address below.

CRANE® VALVES & FITTINGS

PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill.—Branches and Wholesalers Serving All Areas

Circle 9450 opposite covers.



Fuel savings of $10,000 per year have been realized since high-pressure condensate return system was added to this paper machine at Crown Paperboard Co., Inc. Product uniformity and output have also improved

By using a closed-loop, high-pressure condensate return system on its paper machine, Crown Paperboard Co., Inc. . . .

Saves $10,000 a yea

a PI Staff Report

Problem: If good, even transfer of heat from steam to cylinders of paper machine is not obtained, both quality and quantity of product from machine is affected.

For example, if cylinders are partially filled with condensate or non-condensable gases, the dryer surfaces would be hotter where steam contacted them than in areas where condensate was in contact. Then, as sheet passed over these rolls, it would be unevenly heated, tending to cause cockling and wet spots.

This also occurs when some rolls become hotter than others.

When wet spots occur, or paperboard has non-uniform moisture content, operator must slow machine down. Tearing of sheet can also result.

Crown Paperboard Co., Inc., Philadelphia, uses a seven-cylinder machine consisting of 81 dryers, 36″ diameter by 78″ long with 73″ widest trim.

While this is an old machine, it has always been well maintained. Condensate from the 81 dryers was trapped by 5 tilting traps dumping into an open hot well.

From hot well, a transfer pump moved condensate (along with softened make-up water) through vent condenser into a deaerating feed water heater.

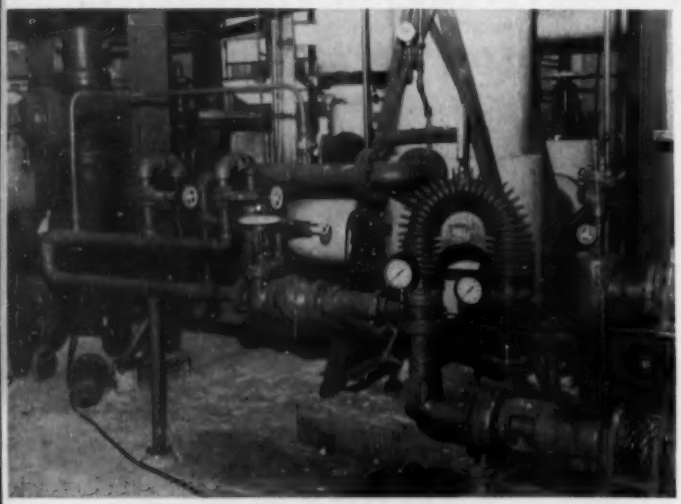
Solution: Realizing that a closed-loop condensate-return system would have less thermal loss, Crown Paperboard installed such a unit on the paper machine.

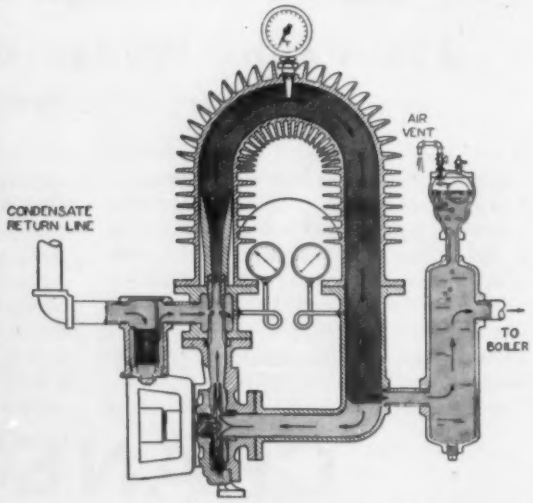
In order to do so, the five condensate lines were manifolded ahead of tilt traps which were then eliminated. Condensate now flows to suction side of a 25-hp condensate drainage control unit through a small heat exchanger (16½ sq ft) to condensate excess flow-through steam thereby insuring continuous consistent condensate flow.

Inlet is about 3′ below bottom of dryers.

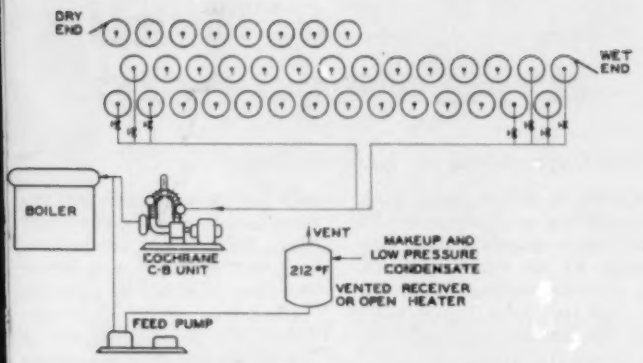
Entrained air and non-condensable gases are removed from dryers (see flow diagram) and are eliminated to atmosphere on discharge side through an air-separating chamber. Condensate is automatically charged to a single 160-psi boiler at a rate at which it is formed.

As ordinary feed pumps are not capable of handling a mixture of entrained non-condensable gases and condensate at close-to-vaporization temperatures, system uses specially designed centrifuga





Schematic drawing and photograph of control unit—jet pump in circulating loop is energized by centrifugal pump below. Condensate, air and gases enter jet chamber through strainer at left. Jet action then draws condensate into loop through Venturi mixing chamber. Addition of condensate displaces liquid from already filled loop through air separator to boiler supply line. System such as this can be used on almost any type of steam-heating installation



low diagram shows installation of Cochrane C-B condensate drainage control unit in relation to dryers on paper machine

on FUEL

ump to overcome any flash-ng difficulties.

The pump draws water from he thermo-fin priming loop see schematic) and discharg-s it as a high velocity jet hrough jet-pump nozzle.

Jet strikes returning hot ondensate and induces flow hrough Venturi-shaped mix-ng tube and into thermo-fin riming loop. The additional olume of condensate intro-uced into constantly filled op results in discharge of an qual volume of condensate hrough an air separator to he boiler.

Hot condensate and en-rained air are drawn rapidly nd positively from paper ma-hine dryers by jet pump. Air eliminated from circuit, as escribed previously, by pass-ng through air separator.

Condensate is returned at aximum temperature and ressure directly to boiler.

Thus, circuit is completed in closed loop from boiler hrough turbine, exhausting to aper machine dryers and ack to boiler without sub-antial loss of temperature.

Performance of unit is veri-ed by pressure gages on in-t and discharge sides plus hermometer in the loop.

Results: With condensate oing directly to boiler at steam temperature, there is at least 88 degrees more temperature available — equivalent to more than 8% fuel saving on that portion of fuel used to generate steam for the dryers.

By another calculation, an 88° increase in 32,500 lb of condensate per hour is about 2,860,000 Btu per hour. This saves 20 gal of 140,000 Btu oil per hour.

At an oil cost of 6 cents per gal, this amounts to $1.20 per hour, $28.80 per day, over $200 a week, and more than $10,000 a year in fuel saving alone.

In addition, there is a real saving in recovery of water previously lost from hot well by flashing and in cost of feed-water treatment for this additional make-up. Most important and most valuable of all is the increased production of the paper machine.

The uniformity of surface temperature and closeness to which it can approach a temperature corresponding to steam pressure utilized under condensing load accounts for maximum production speed and improved product quality.

(C-B condensate drainage control unit is manufactured by Cochrane Corporation, Dept. PI, 3147 N. 17th Street, Philadelphia 32, Pa.)
Circle 9451 opposite covers.

Operator adjusts 1½-inch hard-seat globe valve at liquid ammonia receiver. Same type valves, in different sizes, are installed on inlet from condenser (foreground), outlet (rear), and balancing lines for gages and safety valves (center)

Hard-seat valves need no maintenance on ammonia refrigerant service

Round-the-clock refrigeration is vital in the production of margarine and shortening at Lever Brothers plant in Hammond, Ind. Rated 500 tons, refrigeration system is shut down only once a year for routine maintenance.

Thus, refrigerant valves must close tightly after a year's continual exposure to possible seat and disc erosion or wear and to deteriorating effect on packing.

Forged-steel globe valves with hard-seat trim (13% chromium stainless steel) have performed perfectly since being installed eight years ago. No maintenance has been needed except for annual application of all-purpose grease to stem threads to avoid possible corrosion.

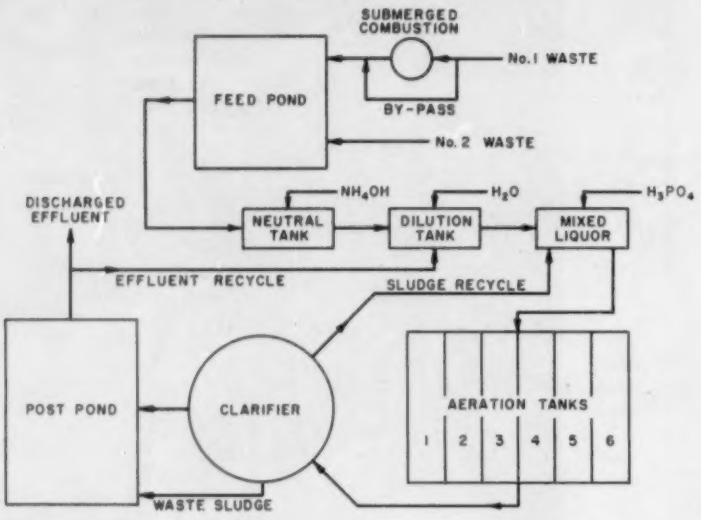
Valves are installed on inlet, outlet, and balancing lines to liquid ammonia receiver, at 125 psi nominal working pressure.

(Forged steel globe valves are manufactured by Edward Valves, Inc., subsidiary of Rockwell Mfg. Co., Dept. PI, 1234 W. 145th St., East Chicago, Ind.)
Circle 9452 opposite covers.

Treats Nylon Waste

From page 9

Waste treatment plant combines use of several techniques to process efficiently nylon waste



Clarifier is 70 ft diam x 15 ft deep, has overflow rate of 1000 gal/sq ft/day

allow further expansion by a factor of 20%, or to 60,000 ppd. Resulting degree of treatment necessary neglecting effect of lagoon storage was about 70%.

Once the design basis of the treatment plant was known the next step was selection of the most economical and efficient process that would achieve the desired reduction. Rigorous laboratory and pilot plant studies were started in August 1955 to find the answer.

System finally decided upon consisted of: 1) submerged combustion burner to treat No. 1 waste, 2) large lagoon where equalization of No. 2 waste and submerged combustion effluent would take place, 3) neutralization tank for ammonium hydroxide addition, 4) dilution tank with facilities for both river water and recycled treated effluent waste dilution, 5) mixed liquor tank for addition of phosphoric acid and active recycle sludge with waste, 6) six aeration tanks, 7) circular settling tank, and 8) post treatment lagoon used for effluent flow regulation into river.

Evaporation vessel volume for submerged combustion unit was determined to be 1600 gal from retention time (13 minutes) and maximum flow of No. 1 waste (125 gpm). Natural gas facilities were provided for use of 0.1 scfm per gal, or 160 scfm. Air requirements were sized to provide 10 times that amount.

Ammonium hydroxide for waste neutralization was set at 209,000 ppd (20% aqua ammonia). About 1500 gpm of river water was provided for waste dilution. Recycle sludge flow to mixed liquor tank was calculated as 687 gpm.

Aeration tanks were sized from a consideration of loading (1.2 lb BOD/lb sludge) and aeration tank solids concentration. Solids used for calculation were 2500 ppm rather than 3000 ppm in order to provide added safety factor. Based on BOD concentration of influent raw waste, 1.92 million gal of aeration tank volume was provided in six units. These were sized to provide 10,500 scfm or nearly 2000 scfm per unit. Aeration requirements were increased by factor of 15% for safety purposes.

Clarifier was designed for an overflow rate of 1000 gal/sq ft/day. Based on maximum waste flows, calculated size of this unit was 70 ft diam x 15 ft deep.

Results: Construction started in March 1957 and the entire waste treatment plant was completed and in operation by October. Capable of handling up to 30,000 gal waste per hr, plant was started up at the optimum conditions determined during pilot plant operation. Bio-oxidation unit was operated at a loading of 1.2 lb BOD/day/lb sludge and with 2500 ppm suspended solids in aeration tanks. Excess air was used to insure sufficient aeration. Submerged combustion unit was operated with waste retention of about 20 minutes.

Plant was run at these conditions for about 3 months to test equipment and determine process efficiency. Volume reduction obtained with burner was about 75% — well over the desired 50%. That obtained in the bio-oxidation unit was 85%. Sludge oxygen utilization rate was approximately 50 mg oxygen/hr/gm and sludge volume index values were below 100. There was no doubt that the plant could obtain the efficiency for which it was designed. Pollutants in the processed liquid waste are held to a level which is harmless when discharged into river.

Changes were made in operating variables to observe their effect on efficiency. Loading was investigated from 0.3 to about 4.0 lb BOD/day/lb sludge; mixed liquor suspended solids varied from 800 to 3000 ppm; waste retention in aeration tanks was changed over range of 8 to 12 hr; and recycled effluent for waste dilution was boosted from 0 to 100% of the diluent.

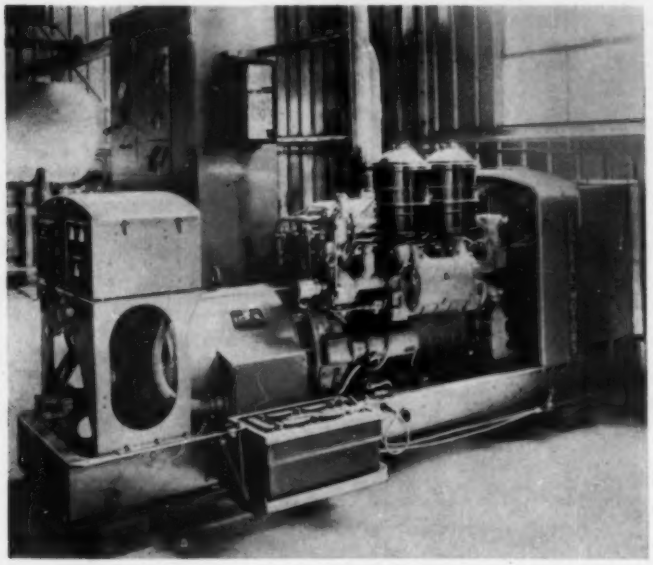
BOD reduction varied from 80 to more than 95%, with maximum reductions obtained at a loading of about 1.0 and waste retention of 12 hr in aeration tanks. Sludge oxygen utilization rates varied from 20 to over 200 mg oxygen/hr/gm of sludge, and sludge volume index changed between 20 and 800.

Successful operation of the treatment plant since last fall reflects the success of the development studies. Analysis and scale-up of pilot plant data provided an accurate basis for efficient operation of the waste treatment plant.

As an adjunct to the treatment program, Chemstrand maintains a constant check on rate of flow in river and takes periodic samplings of river water above and below plant site. ■

NEW DEVELOPMENTS

plant services — power services maintenance



Expanded line of compact and light-weight diesels are capable of driving emergency generator sets from 15 to 700 kw

Offers 20 to 1650 hp diesels in only three cylinder sizes

In an unprecedented move last month, GM's Detroit Diesel Engine Div. unveiled the addition of eight new "V" and "in-line" engines to its line of two-cycle diesels.

The total of 19 single and multiple units ranging from 20 to 1650 hp in only three cylinder sizes expands the usefulness of the line in the standby power field. The expanded line is capable of driving generators with ratings of 15 to 700 kw.

In the lower power ranges, there is a series of small engines with ratings of 20 to 195 hp. These include "in-line" units of 2, 3 and 4 cylinders and a highly compact 6-cylinder "V" engine.

In the higher hp ranges, for "V" engines of 6, 8, 12 and 16 cylinders ranging from 252 to 675 hp were introduced.

These engines, due to their two-cycle design, are extremely compact and light-weight in relation to horsepower, and in many instances no special foundations are required.

Power is delivered on every downstroke of the piston rather than on every other piston downstroke as is the case with four-cycle engines. In addition, this design coupled with a quick-acting hydraulic governor produces a smoothness of torque and quick recovery under sudden load increases. This contributes substantially to maintaining a high degree of voltage accuracy and frequency control.

Full power is usually available in from three to five seconds — and with automatic control there is usually little evidence that standby power has taken over.

(Two-cycle diesel engine line is manufactured by Detroit Diesel Engine Division, General Motors Corporation, Dept. PI, 13400 W. Outer Drive, Detroit 28, Mich.)
Circle 9453 opposite covers.

Stops vibration

For stopping or restraining dynamic vibration and shock loads in piping and high temperature equipment, a hydraulic vibration snubber has recently been developed.

Snubber is an outgrowth from manufacturer's flexible struts. It is simply a self-contained hydraulic cylinder integral in the strut.

This is how the snubber works: Rapid movements such as dynamic vibration and shock loads may or may not be accompanied by a slower, natural movement, such as thermal expansion or contraction.

The entire snubber assembly restricts these rapid vibration movements. However, a more gradual thermal movement is taken care of by bypassing hydraulic fluid through a restricted orifice in the piston of the snubber cylinder.

Involving only a nominal pressure drop across the bypassed orifice against a slow thermal movement, the snubber does away with the preload functional force usually connected with other type dampers.

The vibration snubber assembly can be installed in any position from horizontal to vertical. Units should be used in pairs with acute included angle.

The strut joints at each end of snubber assembly can be welded to pipe or steel structure. Anchor points should be designed to withstand total loading and minimize secondary vibrations.

Unit is offered in two sizes — 2½ inch with load capacity of 7000 lbs and 4-inch with load capacity of 20,000 lbs.

("Vibrasnub" is manufactured by the Barco Manufacturing Co., Dept. S-50, Barrington, Ill.)
Circle 9454 opposite covers.

Flexible conveyor idler is self-cleaning

For belt conveyors handling coal, coke, or other bulk materials, a spiral-shape rubber idler is made of tough synthetic rubber molded around wire rope.

Highly flexible and adaptable to any type of belt conveyor, they are available for belt widths of 18″, 24″, 30″, and 36″.

Features of the double corkscrew-shaped design is: Self cleaning action produced by constant flexing from end to end which prevents build-up of materials; flexibility to conform readily to variations of belt loads; and longer life.

Mounting brackets on either end of idler permit free pivot in vertical plane with the result that the idler hangs naturally and conforms readily to off-center loads.

Replacement is easily accomplished by simply lifting out worn idlers and dropping in new ones without removal of bolts, frames or other holding devices. Intrusion of dirt in the moving parts is prevented by newly-developed seals.

(Spiral-shaped idlers are manufactured by Hewitt-Robins Inc., Dept. PI, 666 Glenbrook Rd., Stamford, Conn.)
Circle 9455 opposite covers.

Heavy duty brake fluid won't boil at 300°F

A heavy duty brake fluid that won't boil away at temperatures up to 300°F has been placed on the market.

The brake fluid meets or exceeds SAE specifications 70-R-1, which requires flow at -60°F and a boiling point not less than 300°F.

It is non-corrosive, can be mixed with existing brake fluids made with castor oil or synthetic bases, and fulfills requirements of all states having brake fluid legislation.

(Puritan Super 60 brake fluid is manufactured by Automotive Products Dept., Chemicals Division, Olin Mathieson Chemical Corp., Dept. PI, 460 Park Ave., New York 22, N. Y.)
Circle 9456 opposite covers.

UNIBESTOS®

GOES ON...
AND ON...
AND ON...

Unless you know UNIBESTOS, it's hard to believe a pipe insulation so easy to use is *also* the most efficient and durable. UNIBESTOS won't shrink or break. You can walk on it, hit it with a hammer! Moisture, fumes, and vibration do no harm, yet it cuts quick and clean without spalling.

World's Finest Pipe Insulation

With UNIBESTOS, a single layer locks-in more heat than most double-layer insulations. You can put it on without calking... take it off without damage . . . reinstall without loss of efficiency. Service life is virtually limitless.

Worth More Money

UNIBESTOS is the only pipe insulation made almost entirely of strong, long-fiber asbestos, but still it's competitively priced. In major power plants . . . in the petrochemical and processing industries . . . it has won acclaim for *proved performance* that's best for your plant, too.

Write for Catalog F76-321 with exclusive "J" Factor Tables

UNION ASBESTOS & RUBBER CO.
General Sales Offices
1111 W. Perry St., Bloomington, Illinois

Circle 9457 opposite covers.

Distribution system gives longer spans between poles

Intended for both utility and industrial distribution circuits ranging from 5 to 15 kv, overhead distribution system is more compact and simple to install, splice and terminate even when "hot."

The system can be installed in locations where additional circuits are required on one pole, where poles are too crowded for additional cross arms, where bad tree conditions are encountered, and in alleyways where space prohibits cross arms.

Plexiglas spacer can be installed or removed by one man without any special tools

In addition, the system offers: High-strength supporting messenger for protection against storms; longer spans (system's weight permits spans to 300 ft without overloading the pole with excessive tensions); and lower reactance resulting in better voltage regulation.

Integral unit in the aerial-spaced cable package is a simplified spacer made of Plexiglas. Each spacer is equipped with four neoprene grommets (adapters). Special built-in compression rings in the grommets assure a snug spacer-to-cable fit.

Constant pressure exerted upon the messenger and conductors restricts spacer from "walking" or sliding from its original position on the line, thereby maintaining proper conductor spacing.

Spacer itself is shaped somewhat like a diamond (see illustration) with rounded corners and smooth edges. Each of the phase conductors and messenger are contained within the encompassing spacer units when they are fitted into position. The messenger fits inside top corner, phase conductors fit inside bottom and side corners.

Spacer is securely locked at bottom by a single ring-fastener.

Although a variety of conductors are applicable, manufacturer suggests use of stranded hard-drawn aluminum covered with a high-molecular-weight polyethylene.

("Trimline" distribution system is manufactured by Rome Cable Corp., Dept. PI, Rome, N. Y.)
Circle 9458 opposite covers.

For better TV viewing, unit magnifies readings of boiler level

When using closed-circuit television systems for remote reading of boiler drum-water level-gages, unit magnifies gages four times for better viewing.

Unit comes pre-wired with lamps installed and ready to mount directly to manufacturer's Multi-Port water level gage. Power is used only to provide front illumination of magnifying ports for better television viewing. No additional front illumination is required.

Unit weighs twenty pounds. Screwdriver and end wrench are only tools required for installation and adjustment to water-level gage.

("Magniport" is manufactured by Electronics Division, Diamond Power Specialty Corp., Dept. PI, Box 415, Lancaster, Ohio.)
Circle 9459 opposite covers.

Air-powered gun cleans, descales

For removing rust and scale and for cleaning metal, stone, or masonry surfaces, air-powered gun handles these jobs by means of a set of rapidly reciprocating steel needles striking surface being cleaned.

Gun operates on normal air pressure — not more than 90 psi — with air consumption being a maximum of 13 cfm.

Air-powered gun cleans surfaces by striking them with rapidly reciprocating steel needles

Uneven surfaces are cleaned rapidly and effectively as the needles conform to the contour of the surface being cleaned. In addition, the needles can reach into crevices, holes and corners to clean out difficult and inaccessible places.

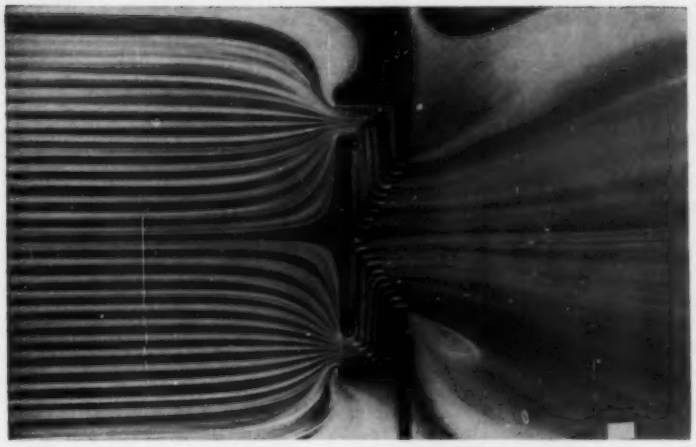
Use of gun does not interfere with regular production, as work is done on-the-spot. Protective devices are not necessary since there are no flying particles of rust, sand, scale or shot.

Action is controlled by a trigger on the handle.

(Von Arx Air Gun is manufactured and distributed in New York and the North Central States by Swissair Tool Corp., Dept. PI, 3775 Sheridan Dr., Buffalo 21, N.Y.)
Circle 9460 opposite covers.

(Distributor in the East and South is The Marindus Company, Dept. PI, 52 Wall St., New York 5, N.Y.)
Circle 9461 opposite covers.

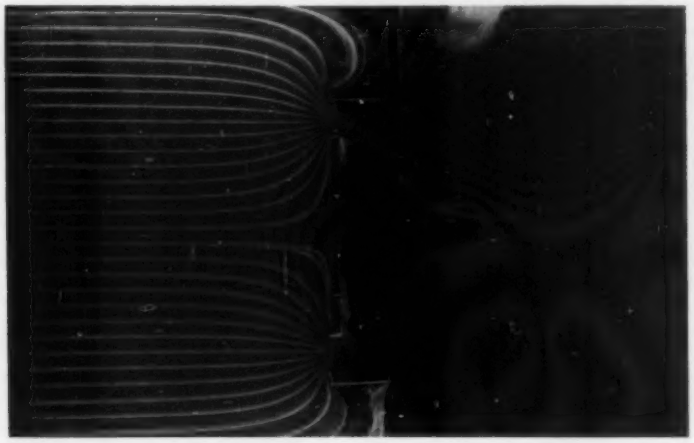
(Western distributor is T. G. Cullen & Co., Dept. PI, 3718 Grand Ave., Oakland 10, California.)
Circle 9462 opposite covers.



Developed for study of gas in motion, model analyzer . . .

Solves air or liquid design flow problems *Visually*

Two examples of flow in two dimensions. While these are examples of gaseous flow which have been improved by installation of corrective devices (above), the ease of improving flow and eliminating turbulence indicates possibilities inherent in instrument. Need for improvement in design technique is illustrated by example below



Developed especially for study of behavior of air flow in two dimensions, flow analyzer can be used in design studies involving any fluid medium — compressible or non-compressible.

Instrument will solve air or liquid flow design problems visually — in model form — before any expense has been sustained.

Instrument is a visual flow indicator for any construction involving flow which can be cut into sections and duplicated in model form. These models can show behavior of gases in motion, and provide valuable information concerning the flow of liquids.

Already the subject of numerous engineering seminars, the instrument's practical aspects have been under investigation in several research laboratories. But, there are no graphs or charts available as yet to show performance or test results.

Smoke Jets

Utilizing a petroleum mixture for fuel, a separate adjacent unit generates smoke, which is drawn into the console at a manually adjustable rate. Manifold pressure ejects smoke from numerous equally spaced jets. These are placed in a horizontal plane between two heavy plates of glass. Fresh air is introduced into spaces between the jets of smoke. Thus, a laminated pattern of alternate jet streams is developed. Variations of the smoke pattern can be clearly observed and photographically recorded.

Air streams can be manually adjusted in speed through a wide range, providing pressure feed or vacuum exhaust — or any combination of both. This control system allows ready simulation of velocity change, or adjustable readability of smoke pattern.

Problem models are placed on a clear plastic sheet and retained between the two glass plates. Smoke and air adjustments are made to provide best visibility of problem.

Although velocities used are of great importance, use of the instrument has already demonstrated that higher testing velocities are not necessary to detect trouble areas or a need for design improvements to eliminate unwanted conditions. Already, extensive laboratory work has shown problems existing at lower velocities — and easily detected — are generally aggravated by higher velocities.

Just as an example, flow through restricted and tortuous paths, frequently necessitated by space limitations, can result in limited capacity and high power requirements. Good design, using corrective devices to control flow, will eliminate much of the turbulence and provide for complete utilization of the flow areas. Test results in many cases have shown methods for improvements of design, thus reducing power requirements and pressure loss. Simple observation of the flow pattern indicates points where corrections are needed.

Power requirements are 115 volts, 60 cycles, single phase. Exhaust fumes are generally not objectionable, but they can be ducted to the outside air. A mirror is installed in the cover.

(Visu-Flo is product of Design Engineers, 214 South Church St., Rockford, Ill.) Check 9463 opposite covers.

Visual flow indicator for test and design problems involving turbulence, back flow, cavitation, temperature, and power requirements

AIRETOOL
PNEUMATIC TOOLS
do 9 hours work in 8

The powerful air motors used in Airetool pneumatic tools step up operator production without increase in fatigue. They deliver constant speed over long work periods . . . without heat-up or stall. And lightweight, balanced-design Airetool production tools handle comfortably and easily—take lots of abuse with no loss in efficiency. As a result, Airetool users report an extra hour's production in a day's work.

HORIZONTAL GRINDERS

For general grinding, snagging, buffing and wire wheel work, 4" to 8" wheel capacity.

VERTICAL GRINDERS

For cup and depressed center wheels, grinding, sanding and wire wheel work. 6" wheel and 7 to 9" sanding disc capacity.

MIDGET DIE GRINDERS

For intricate precision grinding, filing and cutting jobs with carbide burrs and abrasive wheels. 38,000 to 60,000 rpm operation.

PNEUMATIC DRILLS

High efficiency, portable models. 5/32, 3/16, 1/4, 1/2, 3/8 and 3/4" capacities.

Write for free illustrated Catalog #63.

AIRETOOL
SPRINGFIELD, OHIO
BRANCH OFFICES: New York, Chicago, Tulsa, Philadelphia, Houston, Baton Rouge
REPRESENTATIVES in principal cities of U.S.A., Canada, Mexico, Puerto Rico, South America, England, Europe, Italy, Japan, Hawaii
EUROPEAN PLANT: Vlaardingen, The Netherlands
CANADIAN PLANT: 37 Spalding Drive, Brantford, Ontario

Circle 9464 opposite covers.

One-shot cleaning sol'n easily gets dirt off electronic air cleaners

Recently developed detergent cleaner and adhesive solution solves problem of how to completely get rid of collected contamination on electrodes and plates of collecting cells in electronic air cleaners.

Air-borne dirt, collecting on electrodes and plates, has a greasy texture, and it is not readily washed off with just hot or cold water, even when adhesive is applied after each washing. This one-shot solution — mixed with wash water — gives complete washing of collecting cells, then dries and leaves an adhesive coating on collecting plates and electrodes.

Applicator system is supplied as a package. It works with either vertical traveling washing systems or with horizontal fixed washing systems.

During the first 2/3 of the washing cycle, pure water — either hot or cold — is used to flush off accumulated dirt and to wet thoroughly the unit.

At beginning of last 1/3 of cycle, a metering pump starts and forces a measured amount of solution into wash water. This forms soapy emulsion and acts as a grease-dissolving detergent which cuts dirt from metal surfaces.

After cells have dried a slightly sticky surface on plates and electrodes is left to serve as an adhesive to hold collected dirt and also facilitate next washing.

(DAX system is manufactured by Electro-Air Cleaner Co., Inc., Dept. PI, Olivia and Sproul Sts., McKees Rocks, Pennsylvania.)
Circle 9465 opposite covers.

Portable air vibrator attaches almost anywhere

Weighing approximately 90 lbs and not using any bolts, portable air vibrator can be attached to almost any type of frame, bin, box or table.

The 3-inch air vibrator has jaws that open to 2 inches and is attached simply by tightening vise-like clamp which is part of the vibrator.

Vibrator also has an eye through which a hoist hook may be attached for ease in moving. Overall dimensions are 14¾" x 13" x 6".

Vibrator simply clamps on — no bolts, brackets or pins are needed

It develops 3600 vpm at 60 psi with air consumption of approximately 20 cfm.

(VGV air vibrator is manufactured by the Cleveland Vibrator Co., Dept. PI, 2828 Clinton Ave., Cleveland 13, Ohio.)
Circle 9466 opposite covers.

Series of tubes efficiently cools enclosed motors

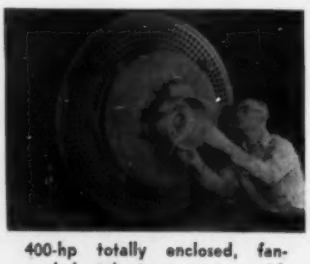
Offered in polyphase ratings through 500 hp, series of totally enclosed squirrel-cage motors is cooled by a series of tubes through which outside air is forced by an external blower.

An internal blower at each end of the rotor circulates warm air inside the motor through ducts in the rotor and stator and around the cooling tubes, to hold the temperature rise within the specified limit.

Standard enclosed motors are built with Class A insulation for 55°C rise or with Class B insulation for 75°C rise. Explosion-proof motors are built with Class A insulation only.

Standard models are designed with steel-backed babbitt-lined sleeve bearings lubricated by oil ring method.

(Tube type polyphase motors are manufactured by Wagner Electric Corp., Dept. PI, 6400 Plymouth Ave., St. Louis 14, Mo.)
Circle 9467 opposite covers.



400-hp totally enclosed, fan-cooled tube-type motor with blower shield removed

Pliable electrical conduit can be easily bent into any shape

Employing a tube formation composed of layer of continuous metal, and allowing maximum protection for cable, pliable electrical conduit can easily be set and bent to negotiate corners and curves — eliminating need for bends and elbows.

Metal conduit can be bent and shaped without distortion of bore

It is pressure-sealed to keep out oil or water.

Despite its extreme pliability, conduit remains almost rigid after bending and can be shaped in any radius without distortion of bore. It is easily cut with a knife.

Specially designed adaptors make it easy to join the con-

duit to standard electrical fittings, to inspection and junction boxes, etc. A seal-tight end fitting assures completely dry conduit system.

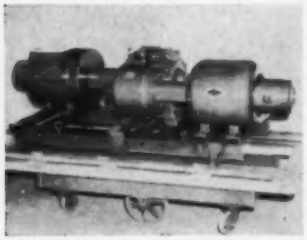
Big feature is that it can be produced in continuous lengths, or minimum 100-ft coils in standard electrical sizes from ½" to 1¼". It is available with polyvinyl chloride outer covering giving complete protection against corrosive attack.

(Pliable conduit is manufactured by the Kopex Division of Gemmer Manufacturing Co., Dept. PI, 6400 Mt. Elliott Ave., Detroit, Mich.)
Circle 9468 opposite covers.

Motor generator permits frequency adjustment under any load

By turning a simple hand crank, frequency of motor-generator set can be adjusted under any load conditions.

Accompanying illustration shows one in the line of such machines. This particular machine is rated at 15 kw, 0.8 PF, 115/200 volts, three phase. It produces 400 cycle AC at 1714 rpm with frequency con-



Pictured is 15 kw, 0.8 PF, 115/200 v, 3-phase M-G set

tinually adjustable from 380 to 420 cycles per second.

Mounted on a heavy welded steel base, unit includes (from left to right): 400-cycle variable alternator with separate rotating DC exciter, totally enclosed speed control, and synchronous motor exciter.

Base rests on six mounting feet equipped with vibration isolators which are positioned to support weight of machine evenly to prevent coupling misalignment. Machines are connected in tandem with flexible couplings which are protected with guard. Lifting eyes placed in mounting base permits easy handling.

Drive motor is of synchronous type, 25 hp, 3-phase, 60 cycle, 208/416 volts, 1800 rpm. Exacting speed is retained providing there are no frequency fluctuations in the commercial power lines.

(Variable frequency motor-generator sets are manufactured by Kato Engineering Co., Dept. PI, Mankato, Minn.)
Circle 9469 opposite covers.

It's a ventilator! It's a skylight!

Doubling as a skylight, high-capacity gravity roof-ventilator has translucent fiberglass dampers and gutters that provide natural light.

The fiberglass dampers and gutters are strong, non-warping and resistant to damage

Ventilator doubles as skylight

from fumes and chemicals. Whether open or closed, the dampers transmit well diffused light, and it does not produce isolated hot spots with accompanying glare.

Each 7½ by 10-ft unit has 30 sq ft of free air opening. Overall height is 21½ inches. Design of ventilator moves large volumes of air quietly and efficiently.

As a safety feature, a fusible link mechanism parts when temperatures exceed 212°F, automatically opening dampers to vent fire, smoke and gases out of building.

("Lite-'n-Aire" is manufactured by The Swartwout Co., Dept. PI, 18511 Euclid Ave., Cleveland 14, Ohio.)
Circle 9470 opposite covers.

Measures flow rate horizontally, vertically

Especially suitable for measuring lubrication flows to bearings, coolant flow to electrical devices, and similar services, flow rate indicator comes in one-piece bronze body providing greatest strength with least weight.

Device is designed with pipe connections for vertical or horizontal mounting, or a combination of both.

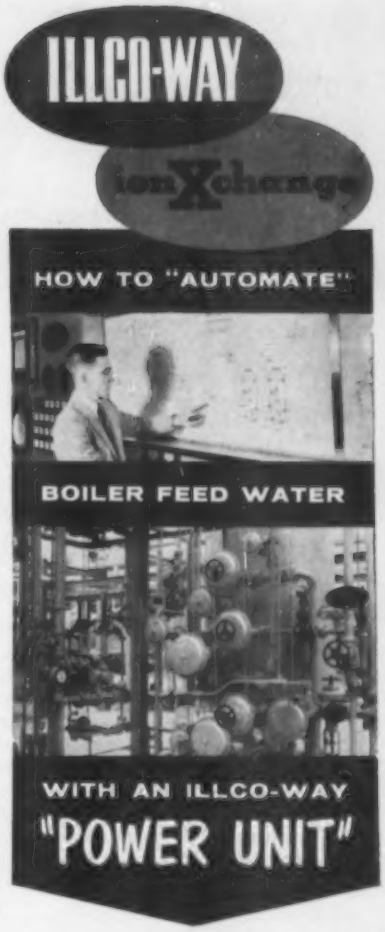
Pipe connections handle horizontal, vertical flow, or combination of both

Three meter sizes cover flow ranges from fraction of a gallon per minute to 26 gallons per minute of liquid, or 65 standard cubic feet a minute of gas.

Meter is available with vibration-proof flow alarm switch for high and/or low flows.

(Ratosight flow rate indicator is manufactured by Fischer & Porter Company, Dept. PI, 797 Jacksonville Rd., Hatboro, Pa.)
Circle 9471 opposite covers.

For more information on items reported in the New Developments section, circle corresponding numbers on reader service card opposite inside covers.



These pictures show an *Automatic* Mixed-Bed De-Ionizer designed for an outdoor installation at a power plant in Louisiana. The high-pressure boilers require feed water of uniform maximum purity — which this ILLCO-WAY "Power Unit" supplies *without attention* other than periodic checks of recording instruments. ILLCO-WAY "Power Units" are shipped *completely assembled*, ready for installation and hook-up.

REMOVES SILICA AND CO_2

The Mixed-Bed IonXchanger, as designed and manufactured by Illinois Water Treatment Company, is often the most economical and most reliable means for treating *any kind* of supply water to obtain the maximum purity required by modern power plants. *See your ILLCO-WAY representative for details on specific applications.*

U.S. PATENTS: 2,771,424 2,605,004

ILLCO-WAY | ILLINOIS WATER TREATMENT CO. 840 Cedar St. Rockford, Ill.

NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Can.

Circle 9472 opposite covers.

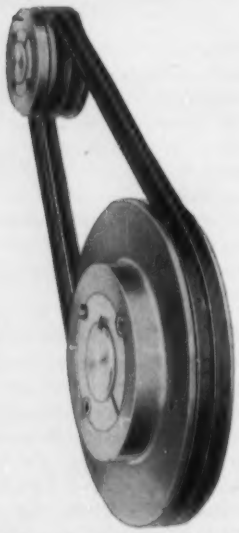
Smaller size, weight featured in line of V-drives

Featuring smaller and lighter sheaves — and consequently use of smaller V-belts of higher capacity — complete line of V-belt drives covers range of horsepower capacities available in convention drives.

Savings in space and weight are made possible by a development of stronger metals for sheaves and synthetic rubbers and fibers for belts.

With this line of drives, majority of industrial drives can be handled with belts only ⅜-inch wide and sheaves greatly reduced in both the width and outside diameter.

Two standard groove sizes are offered: Besides the ⅜-inch (nominal top width) size, a ⅝-inch size handles higher horsepowers. Sheaves in the ⅜-inch size — from 1 to 10 grooves — are designed for drives ranging from 1 to 50 hp. The ⅝-inch size, with 3 to 10 grooves, handles drives up to 200 hp.



Two size belts are offered — ⅜ and ⅝-inch wide

The belts, besides being small in cross-section, lighter in weight and stronger, are immune to stretching. The belts are designed with a crown top and concave sidewalls for maximum efficiency. They are oil and heat resistant.

(Dyna-V drives are manufactured by Dodge Manufacturing Corp., Dept. PI, Mishawaka, Ind.)
Circle 9473 opposite covers.

Centrifugal roof ventilator features low profile, wide size selection

Line of rugged, low-profile, low-speed centrifugal type roof ventilators feature non-overloading wheel and spun-streamlined inlet complete with large excess door, motor and V-belt drive.

Line includes 13 basic sizes with various motor and drive combinations resulting in 111

Motor, drive, fan bearings and safety disconnect switch in roof ventilator are easily accessible for inspection or maintenance

catalog sizes. Each size is sound-rated to specific building environments and provides a multiple selection of capacities and quietness ratings for any type building requirement.

Capacities range from 1120 cfm to 34,440 cfm at free delivery to 26,540 cfm at 1-inch water gage static pressure. Non-overloading wheel has twelve large-area, die-formed blades mounted in a backwardly inclined position between a heavy-duty backplate and a die-formed streamlined rim. It has a cast iron driving hub riveted to the backplate.

The deep spun streamlined inlet, which is overlapped by wheel rim, introduces exhaust air to the wheel with minimum turbulence, contributing to the overall high efficiency and quiet operation. Upper and lower hoods, which form housing, are made of heavy-gauge steel which is phosphatized for corrosion-resistance prior to receiving an enamel finish.

Weather band in unit prevents entrance of snow, rain or foreign material. Angle irons support arms between lower hood and weather band add rigidity to the assembly and facilitate mounting of a bird screen when required.

(Model CR centrifugal roof ventilator is manufactured by American Blower Division, American Standard, Dept. PI, Detroit 32, Mich.)
Circle 9474 opposite covers.

Pocket-size instrument spots hazardous vapors; can be used anywhere

For on-the-spot checking of work areas, pocket-size tester easily and quickly detects presence of hazardous vapors.

Rugged, light-weight combustible gas analyzer is self-contained with long battery service life.

Operation is simple: One knob turns unit "On", and zeros the meter. A pilot light

Light-weight instrument detects combustible vapors

indicates "On" and also illuminates dial.

Sample hose and aspirator bulb snap instantly into either side of instrument for right or left hand use. Leather case holds aspirator bulb, 5-ft sampling hose with short probe, spare battery, and a screw driver. Spare filaments are also included.

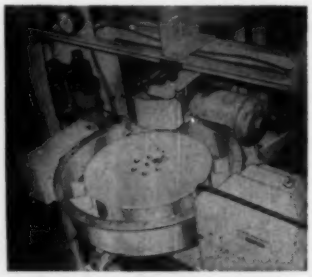
Instrument is not affected by vapors of gasoline containing tetraethyl lead.

(Bantam Vapotester is manufactured by Davis Emergency Equipment Co., Inc., Dept. PI, 55 Halleck St., Newark 4, N. J.)
Circle 9475 opposite covers.

Continuously weighs feeds by gravity

Providing high accuracy in automatic feeding, system consists of a continuous weigher and gravimetric feed.

Weigher consists of a circular trough through which passes a series of flights attached to rotating plate. These flights convey material in positive, continuous, circular flow through approximately 300° from entrance to exit points.



System gives continuous record of weight

Pivot axis of the weigher and entrance and exit points are all in vertical alignment, providing for easy installation within existent equipment.

Completely enclosed, dust-tight and gas-tight, system will give flow rate figures in any unit of measurement, provide a chart record of flow rate for 24-hr periods, and record total weight from starting to any given moment.

Control system for weigher is adaptable to standard 3 to 15 psi pneumatic air signal control or mechanical systems.

(Continuous weigher and gravimetric feeder system is manufactured by Stephens-Adamson Mfg. Co., Dept. PI, Aurora, Ill.)
Circle 9476 opposite covers.

Have high ceilings? Fixtures provide proper lighting

Designed for interior lighting of buildings having high ceilings (particularly shops with overhead cranes), lighting fixtures are light in weight, and easy to assemble and wire.

These high-bay units are available for 300-1500 watt incandescent or 400-watt mercury lamps. Fixtures may be ordered with separable or single piece head, and with wide-angle reflectors suitable for low and medium mounting heights.

For high mounting in narrow areas they can be equipped with concentrated reflectors.

(Type MDS fixtures are manufactured by Crouse-Hinds Co., Dept. PI, Syracuse 1, New York.)

Circle 9477 opposite covers.

Remote bulb thermostat has two switches

Can be used in place of two separate single-switch units

Containing two switches, remote bulb temperature control unit may be used in place of two separate single-switch controls in many applications including air conditioning.

Each switch can be adjusted individually to give a maximum span of 15°F between switches

Available in range bands of 100°F or 200°F between limits of −150°F and 650°F, models feature on-off differentials of approximately 1° and 2°F. An adjusting screw is attached to each switch so that it can be adjusted individually up to a maximum span of 15°F between switch settings.

This span is maintained constantly throughout control range. Wider spans are available upon specification.

Complete unit consists of bulb, capillary tube, bellows, and control head. Bellows is attached to control head and is connected to the remotely located bulb by means of capillary tube.

Bulb, capillary tube, and bellows are all completely liquid-filled and incompressible.

When heat is applied to sensitive bulb, liquid expands and causes a uniformly linear motion of bellows plunger. Plunger operates switches when the temperatures reach points established by the control adjustments.

The bellows is spring-loaded to ensure quick, accurate response to all changes in temperatures.

Variety of bulb styles and capillary tube lengths are available.

(Type E27A temperature control is manufactured by United Electric Controls Co., Dept. PI, 79 School St., Watertown 72, Mass.)

Circle 9478 opposite covers.

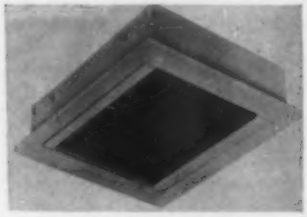
Heater installs in ceiling

1000-watt radiant heater fans heat over large area

Capable of heating large areas with increased efficiency, recessed radiant ceiling heater is mildly fan-forced so that proportion of convection heat which would normally hang at ceiling is gently circulated throughout room.

The 1000-watt unit is easily installed and serviced, as finishing frame is spring-hinge mounted and readily removable. Both blade and motor have been engineered to operate noiselessly. Having a shipping weight of 15½ pounds, three models are available for various voltages — 120, 208, 240.

Units are controlled by wall-mounted switch and can be used with or without a separate wall thermostat. Heater can be wired-indirectly with standard R or TW building wire — it does not require a pre-wired junction box.



Recessed ceiling heater is rated at 1000 watts

Fan motor is two-poled, unit-bearing type with sealed-in lubrication. Rotor is dynamically balanced for ultra quiet operation.

Thermal safety cut-off automatically disconnects heating element in case of overheating due to high voltage or motor failure.

(Model RC heater is manufactured by Berko Electric Mfg. Corp., Dept., PI, 212-40 Jamaica Ave., Queens Village 28, New York.)

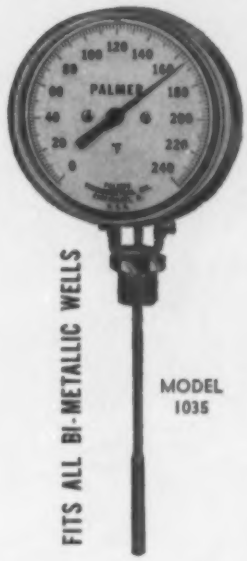
Circle 9479 opposite covers.

"Cream and sugar . . .?"

Outstanding Accuracy

PALMER

Dial Thermometer



Check these functional features

- Direct-drive Bourden Coil with a filled system for longer lasting accuracy.
- Stem can be placed at any desired angle and case can be rotated to most readable position.
- External calibration for zero setting.
- Unaffected by stem alignment.
- Accurate to one scale division.
- No sticking at any temperature.
- Non-corrosive case.

PALMER

THERMOMETERS, INC.

Mfrs. of Industrial Laboratory, Recording and Dial Thermometers

2515 Norwood Ave., Cincinnati 12, O.

Circle 9480 opposite covers.

NEW LITERATURE

plant services — power services maintenance

Reviews of books and industrial bulletins describing equipment, supplies, services

Aluminum for electricity

"More kilowatts per dollar" is the theme and title of a 34-page brochure discussing architectural, mechanical, and electrical uses for aluminum in electrical power generating stations.

Discussed are sixty types of applications where use of aluminum means initial, installed, or service-life savings to the user.

Discussions range from application of switch-yard bus conductors, aluminum siding, and ducts to the newer uses such as, switchyard structures, die-cast stair treads, and tubes for surface condensers.

Pictures illustrate aluminum in service in power plants.

("More kilowatts per dollar" booklet is available from the Aluminum Company of America, Dept. PI, 756 Alcoa Bldg., Pittsburgh 19, Pa.)
Circle 9481 opposite covers.

Describes all kinds of thermocouples

Generously illustrated with data, charts and pictures, eight-page catalog describes lines of thermocouples for wide range of applications.

Features of the thermocouples include temperature range from −400° to 2000°F, diameters of .025" to 0.313", fast response and pressure tightness to 50,000 psig.

Thermocouples can be bent to any shape and weldments can be performed directly on it.

Specifications include choice of diameters, materials, typical connectors, junctions and terminations.

(Bulletin 3.8A is issued by Aero Research Instrument Co., Dept. PI, 315 N. Aberdeen St., Chicago 7, Ill.)
Circle 9482 opposite covers.

Cooling towers — what goes into them

Sixteen pages of illustrations cover all components involved in construction of counterflow cooling towers having induced draft.

Units incorporate either six-foot parabolic or fourteen-foot, high bell-mount, venturi stacks for increased efficiencies.

(Industrial cooling tower bulletin is issued by Fluor Products Company, a division of The Fluor Corporation, Ltd., Dept. PI, Whittier, California.)
Circle 9483 opposite covers.

Shows safety hats

Safety hats and caps, highly resistant to impact and penetration are pictured in a four-page bulletin. Hats and caps come in nine colors — red, blue, white, yellow, black, gray green, orange and brown — enabling quick personnel job identification.

(Bulletin #0601-4 is issued by the Mine Safety Appliances Co., Dept. PI, 201 North Braddock Ave., Pittsburgh 8, Pa.)
Circle 9484 opposite covers.

Lots of wheels for grinding

Two hundred standard sizes and 86 standard shapes of abrasive and mounted wheels are the subject of 12-page bulletin.

All mounted wheel illustrations are full size, shown with exact dimensions and prices.

(Bulletin 1505 is issued by Chicago Wheel and Manufacturing Co., Dept. PI, 1101 W. Monroe St., Chicago, Ill.)
Circle 9485 opposite covers.

For any angle — worm gears

Versatile mounting for top, bottom, vertical, side-wall or angled drive of durable worm-gear speed reducers is described in a four-page bulletin.

Full-page tables for complete horsepower and torque data for worm gear units having 2½ to 4-inch centers are given.

Dimensions are diagrammed and tabulated in detail. Also included are the materials and design of the interchangeable components.

Aluminum fans cool the easy-to-mount cast-iron casing.

(Bulletin 5018 is available from De Laval Steam Turbine Co., Dept. PI, Trenton 2, New Jersey.)
Circle 9486 opposite covers.

Heating coil bulletin

Describing complete line of heating coils, 30-page bulletin contains complete selection information as well as detailed descriptive information on coils themselves.

Included, in addition to more than twenty illustrations, are construction specifications, dimensional data, surface charts, circuiting and piping diagrams.

Units are standard steam coils, steam distributing coils, and hot water coils.

Eight pages of temperature rise charts are given in steam coil section. Also included in this section are face velocity charts, altitude and temperature correction charts, steam-pressure-and-temperature correction-factor chart and condensate-rate tables.

(Bulletin #890 is issued by Dept. PD, American Air Filter Co., Inc., Dept. PI, 215 Central Ave., Louisville 8, Ky.)
Circle 9487 opposite covers.

Fights rust

Four-page bulletin fully describes how material, when applied directly to rusted metal, chemically changes rust to iron phosphate. In this way, the surface is prepared for regular maintenance paint.

Chemical material, called "Ospho", provides a good bond between new metal and paint.

("Ospho" bul is issued by Rusticide Products Co., Dept. PI, 3125 Perkins Ave., Cleveland 14, Ohio.)
Circle 9488 opposite covers.

Distribution systems for gases

Production, space and cost benefits in continuous distribution of industrial gases by custom-built manifold installations are described in 28-page brochure.

Duplex, simplex and portable manifold distributions systems for piping oxygen, hydrogen, nitrogen, helium, argon, acetylene and other gases for uses in welding, cutting, heating, flame hardening, flame blasting and oxygen lance operations are detailed.

(Bulletin N-125 is issued by National Cylinder Gas Division of Chemetron Corporation, Dept. PI, 840 North Michigan, Chicago 11, Ill.)
Circle 9489 opposite covers.

Anchors and hangers for refractories

Two-page service bulletin covers complete line of anchors and hangers for use with refractories and plastic firebrick.

Bulletin contains over 31 photographs and engineering drawings of six major anchor assemblies for castable, plastic and combination specialty and firebrick walls.

Complete recommendations on use of each and installation instructions are included.

(Anchor and hanger Bulletin is issued by J. H. France Refractories Co., Dept. PI, 1944 France Rd., Snow Shoe, Pennsylvania.)
Circle 9490 opposite covers.

Coating protects masonry walls

Containing ten color samples, four-page fully illustrated brochure outlines properties and advantages of heavy-body textured decorative coating for exterior masonry walls. Coating extends weather resistance of walls.

It can also be used for interior masonry surfaces above grade on new as well as existing buildings.

Bulletin includes complete listing of product's water-repellent, elasticity, durability and bonding properties.

(Brochure # BP 3063 is issued by L. Sonneborn Sons, Inc., Building Products Division, Dept. H, 404 Fourth Ave., New York 16, N. Y.)
Circle 9491 opposite covers.

Classifying systems — two types are given

Containing line drawings, graphs, and installations photographs, bulletin explains general operating characteristics of centrifugal and gravitational type classifiers.

Classifiers make use of combinations of aerodynamic forces in ways not generally used.

Information is given on operation, arrangement, power requirements, and construction.

(Classifying systems bulletin is issued by Buell Engineering Co., Inc., Dept. PI, 123 Williams St., New York, N. Y.
Circle 9492 opposite covers.

Wall chart gives stoker-firing hints

Arranged so that it can be hung conveniently in boiler room, four-page wall chart gives graphic stokering instructions for increased efficiency. All instructions are presented in large-size type, making chart easy to read.

Instructions follow a step-by-step procedure.

(Boiler room wall chart is issued by the Bituminous Coal Institute, Dept. PI, Southern Bldg., Washington 5, D.C.)
Circle 9493 opposite covers.

Pictures low-pressure compressors

Giving specifications on three models ranging from 756 to 7392 cfm, eight-page bulletin describes line of heavy-duty, low-pressure compressors.

Details such as sectional drawings are included, together with a complete run-down, with illustrations, on all vital parts and features.

(Bulletin A-95 is issued by Joy Manufacturing Co., Dept. PI, Henry W. Oliver Bldg., Pittsburgh 22, Pa.)
Circle 9494 opposite covers.

Reduced-voltage starters

Design and construction features of automatic reduced voltage starters are described in 12-page bulletin.

Equipment applications include motor control for centrifugal compressors, hammer mills, pumps, large conveyors, large fans, and motor-generator sets.

Covering range of automatic reduced voltage starters from 50 to 1200 hp, 600 volts, bulletin gives descriptive copy on theory and operation of low-voltage starters.

Specification and horsepower ratings are included.

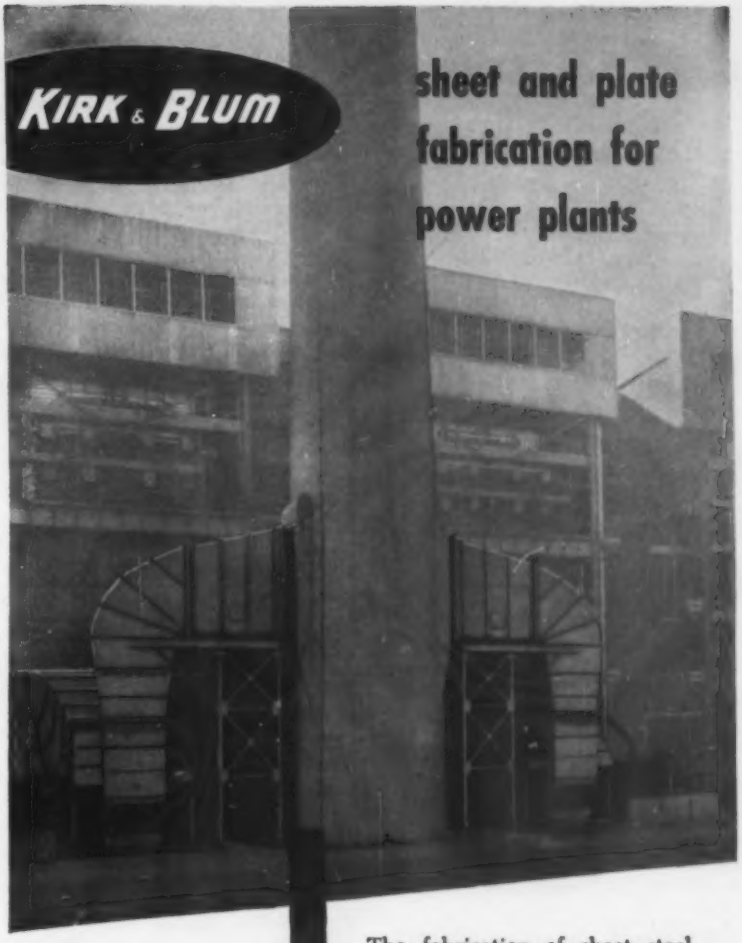
(Bulletin 14B8192 is issued by Allis-Chalmers Mfg. Co., Dept. PI, Milwaukee 1, Wis.)
Circle 9495 opposite covers.

Lists explosion-proof electrical equipment

Emphasizing explosion-proof equipment in everything from lighting to motor controls, 6-page bulletin describes design and construction principles involved in manufacturing electrical equipment for hazardous locations.

Attractively illustrated and easy to read, the bulletin covers such things as panel boards, pilot lights, switches, communication equipment, motor starters and circuit breakers, conduit and fittings.

(Bulletin 2710 is issued by Crouse-Hinds Co., Dept. PI, Syracuse 1, N. Y.)
Circle 9496 opposite covers.



- breechings
- stacks
- air & gas ducts
- casings
- louvers
- bins & hoppers
- insulation jacketing
- control panels & desks

The fabrication of sheet steel and plate to exacting specifications has been a specialty of Kirk & Blum for 50 years. Exceptional experience and complete facilities for fabricating carbon steel, stainless, aluminum, monel and other alloys up to ¼" thickness.

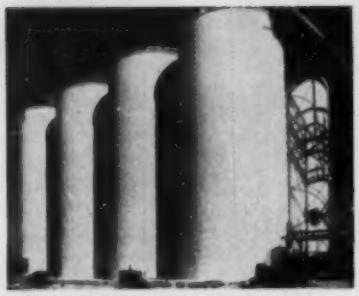
Send prints for prompt quotation or write for your copy of the latest Kirk & Blum Sheet and Plate Fabrication Booklet.

Whatever your requirements in sheet and plate fabrication . . . call on KIRK & BLUM.

THE KIRK & BLUM MFG. CO.
3174 Forrer Street, Cincinnati 9, Ohio

Circle 9557 opposite covers.

SAVE
with a MARIETTA STORAGE SYSTEM Engineered to your own needs



MARIETTA STORAGE SILOS can be erected in any number of units for bulk storage.

● You'll realize a big savings in time, money and materials when you install a modern Marietta Storage System.

Sturdy, interlocking concrete stave silos save materials by keeping them dry, free from waste, protected against weather or fire. And there's practically no maintenance to Marietta storage silos.

Conveyors, feeders, discharge systems or other specially designed equipment save material handling time and speed-up your operation. Whatever bulk material you use, you can depend on Marietta's know-how to design and erect the most efficient system for your need. The complete job will be handled under one cost-saving contract or in cooperation with your engineering staff, consultants or contractor.

Write today for an analysis of your storage problem and ask for a copy of the Marietta Industrial Storage Systems Booklet.

42 Years Know-How in Precast Concrete Construction

THE Marietta
CONCRETE CORPORATION
MARIETTA, OHIO
BRANCH OFFICES:
501 5th Ave., New York 17, N. Y., Jamestown, N. Y., Baltimore 21, Md., Charlotte 6, N. C., Nashville, Tenn.

Circle 9497 opposite covers.

Gear for every job

Twelve-page bulletin — profusely illustrated — describes company's facilities for custom-manufacturing gears.

Types of gears described include: spiral, double ring, double reduction helical worm and multiple thread steel worm, continuous tooth herringbone, large spur, internal gear, and bevel gears, to name a few.

(Bulletin 26 IG is issued by Illinois Gear & Machine Co., Dept. PI, 2108 N. Natchez Ave., Chicago 35, Ill.)
Circle 9498 opposite covers.

Reduces engine noise

How air-jacketed silencers suppress engine noise while ventilating engine room and surrounding areas is told in illustrated four-page bulletin.

Included in the descriptions are dimensions and applications of nine models. All dimensions are given in easy-to-read chart form.

(Data Sheet D-192 is issued by The Maxim Silencer Co., Subsidiary of Emhart Manufacturing Co., Dept. PI, 85 Homestead Ave., Hartford, Connecticut.)
Circle 9499 opposite covers.

Predicts motor failure

Maintenance procedure that enables failures to be predicted in motors and other electrical equipment is described in bulletin.

Secret of procedure is a direct-reading megohmmeter that requires no computations, cranking or leveling.

By using this instrument for periodic insulation resistance tests, a chart is drawn that indicates resistance changes and thus the breakdown of motors and other equipment is forecast.

(Bulletin 2-60.1 is issued by Associated Research, Inc., Dept. PI, 3777 W. Belmont Ave., Chicago 18, Ill.)
Circle 9500 opposite covers.

Describes engineered heat exchangers

Containing many installation photographs, cutaway line drawings, 16-page catalog describes complete line of heat exchangers and pressure vessels specifically designed and engineered for process and power applications.

Two useful charts — "Key to Heat Exchanger Types" and "Preliminary Setting Diagram" — are included. All basic types are fully pictured and described.

(Bulletin N581 is issued by the Southwestern Engineering Co., Dept. PI, 4800 Santa Fe Ave., Los Angeles 58, Calif.)
Circle 9501 opposite covers.

Explains adjustable speed drives

Describing general-purpose adjustable speed drives, eight-page bulletin covers one-hp, half-wave and one- to four-hp, full-wave models.

Standard and optional features, electrical and performance characteristics, application advantages, and key construction features of the controller, DC motor, and operator's control station of drives are fully described.

Photos, cutaway drawings, line drawings, and charts illustrate all points.

(Bulletin GEA-6234B is issued by General Electric Company, Dept. PI, One River Rd., Schenectady 5, N. Y.)
Circle 9502 opposite covers.

Records data

Producing a permanent punched tape, device records data for load survey studies and aids automation of billing.

Sixteen-page catalog pictures and gives full details on the 13" x 12" x 7", panel-mounting instrument.

(Catalog 35A1000 is issued by Fischer & Porter Co., Dept. PI, 826 Jacksonville Road, Hatboro, Pa.)
Circle 9503 opposite covers.

Shows self-cleaning pipeline strainer

Two-page bulletin describes line of self-cleaning, semi-steel pipeline strainers in sizes from ¼" through 3". Features of strainer are high strength construction of the bodies with long, tapered screen sockets that assure tight fit of the screen cylinder without buckling.

Built-in sediment collection chamber is an integral part of cap and has 45° blow-down connection angle.

Strainers are rated for saturated steam or liquids to 250 psig and 475°F total temperature.

(Bulletin 1210B is issued by Sarco Co., Inc., Dept. PI, 635 Madison Ave., New York 22, New York.)
Circle 9504 opposite covers.

Liquid level gages

Eight-page catalog details complete line of gages for remote liquid level indication of boilers, deaerating vessels, boiler feed water tanks, and storage tanks.

Models and datum columns are included. Operation, application, and accessories are explained in detail.

(Catalog #338 is issued by the Jerguson Gage & Valve Co., Dept. PI, Adams St., Burlington, Mass.)
Circle 9505 opposite covers.

Transformer guide

Bulletin of 24 pages acts as a complete reference for selecting small power and control, general-purpose and special-purpose transformers.

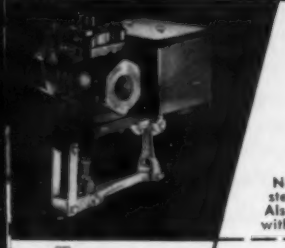
Illustrating bulletin contains a complete description of each transformer type including typical ratings, prices and detailed application information on each type of products.

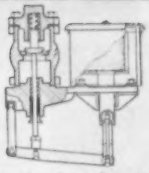
(Bulletin GEA-6723 is issued by General Electric Co., Dept. PI, One River Rd., Schenectady 5, N. Y.)
Circle 9506 opposite covers.

BIG LINE-UP
BIG PERFORMANCE

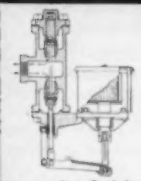
Johnson Solenoid Valves are built for heavy duty service . . . handling, air, water, steam, heavy viscous liquids. No pilots or pistons; powerful leverage design opens smaller valves against 250 lbs. Because of the remoteness of the solenoid, temperatures up to 400° F. are easily handled without adverse effect on the solenoid coil. Bodies are bolted together. Explosion-proof models also.

JOHNSON
Direct Operated
SOLENOID VALVES

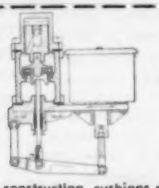




Normally closed service, stainless steel valve and seat. Sizes ⅜"-3". Also for normally open service, and with Jenkins Disc.



3-way valve. Stainless steel valves and seats. Sizes ½"-1½".

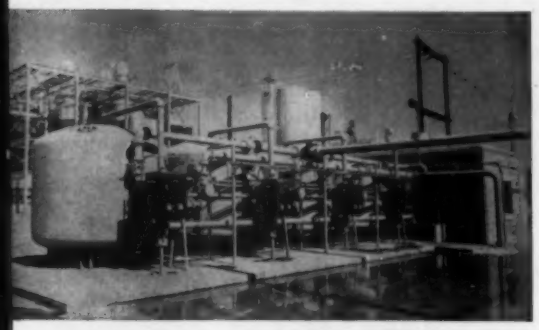


Dashpot construction, cushions closing to avoid water hammer. Jenkins Disc. Sizes ¾"-2".

Write for Bulletin "V"

THE JOHNSON CORPORATION
807 Wood St., Three Rivers, Mich.

Circle 9507 opposite covers.



BOILER FEEDWATER TREATMENT

(for over half a century)

Complete plants for water softening, demineralization, silica removal, de-oiling of condensate, clarification, de-alkalizing and all other requirements.

Send for Bulletin BFT-11
or Nearest Field Representative.

HUNGERFORD & TERRY, INC.
CLAYTON 1, NEW JERSEY

Circle 9508 opposite covers.

CUT HERE AND FILE

Estimating Rates for Roof Ventilators

D. S. DAVIS
Head, Dept. of Pulp and Paper Technology
University of Alabama

Maximum rate of flow of air through a natural roof ventilator can be calculated by the equation:

$$Q = 0.200 L^{\frac{1}{2}} H^{\frac{1}{3}} A^{\frac{5}{6}}$$

where —

- Q = maximum ventilation rate, thousands of cfm
- L = effective height of warm air inside building, ft
- H = rate of heat release to interior air, thousands of Btu/min
- A = area of roof ventilator assuming no restriction to supply of air to lower part of building, sq ft

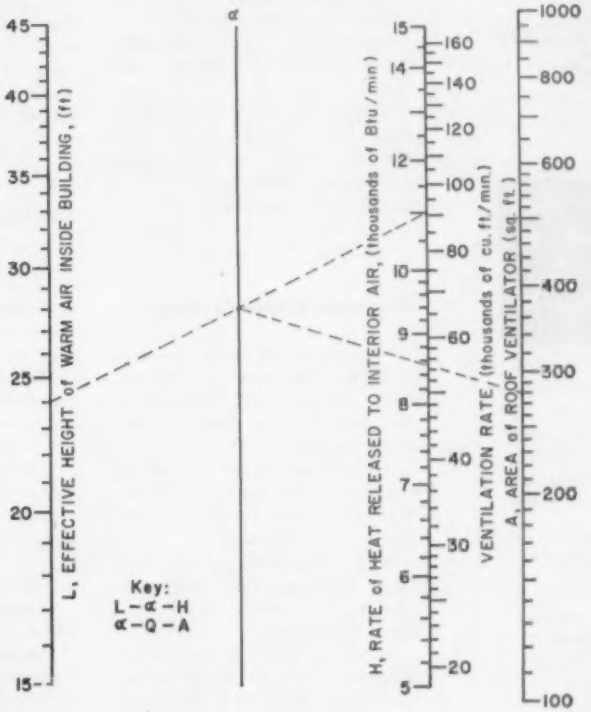
This equation, adapted from information by Hemeon[3], can be solved quickly by nomograph given here. Nomograph was constructed by well-known means[1,2].

Typical Example

What is maximum ventilation rate for a building 27 ft high capped by a 280-sq ft roof ventilator if 11,000 Btu/min are released to interior air?

Assume effective height of warm air inside building to be 24 ft — a little less than height of building.

Following key, connect 24 on L scale with 11 on H scale. Then connect α scale intersection with 280 on A scale. Read ventilation rate as 55 thousands of cfm (55,000 cfm).



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1) Davis, D. S., "Empirical Equations and Nomography," Chap V, McGraw-Hill Book Co., New York (1943)
2) Davis, D. S., "Nomography and Empirical Equations," Chap VI, Reinhold Publishing Corp., New York (1955)
3) Hemeon, W. C. L., "Plant and Process Ventilation," p. 396, The Industrial Press, New York (1955)

HOLDING POWER

Where You Need It!

With WILCOX Self-Sealing GASKETS

When the pressure is on and you need dependable holding power in your lines, you can rely on Wilcox Self-Sealing Gaskets. Over the years, they have proved their outstanding performance. The U-shaped metal outer cover is packed with a resilient filling, usually rubber or asbestos. Pressure exerted on this filling forces it into the cover, putting force against adjacent flange surfaces. Thus, pressures that tend to blow ordinary gaskets make the Wilcox tighter.

Available with covers of copper, lead, tin, aluminum, monel, stainless steel, etc. in all sizes, standard or special.

Write for Bulletin No. 569 and prices.

CHICAGO-WILCOX MFG. CO.

7725 South Avalon Avenue
Chicago 19, Illinois

Circle 9509 opposite covers.

WORN DANGEROUS STAIRS MADE NEW AGAIN—

In One Day . . .

Outwears Concrete, Stone or Marble

SUPER STAIRMASTER NEW Aluminum Safety Treads

Brand new "TRAFFIC-FLOW" design. Made of heavy-duty, non-corrosive aluminum alloy base. Filled with diamond hard abrasive. Non-slip under oil or grease. Easy to clean. Fits tightly, securely, over all types of stairs.

FREE new bulletin shows how to repair stairs GET DETAILS

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1000 Spruce St., Wooster, Ohio
NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____

Circle 9510 opposite covers

NEW LITERATURE

Centrifugal compressors

Two types of single-stage centrifugal compressors — one for low pressure air service, and other for gas applications plus high pressure air are presented in illustrated four-page bulletin.

Capacities range from 1200 to 80,000 cfm, with input horsepowers varying between 10 and 2500 bhp.

Complete details are given on casings, bearings, seals, impellers, lubrication system, baseplates, and couplings, plus recommended applications.

(Bul 165 is issued by the Clark Bros., Co., Dept. PI, Olean, N. Y.)
Circle 9511 opposite covers.

Contains fluid friction, conversion tables

Methods of selecting power pumps for all types of industrial applications is outlined in 26-page data bulletin.

Bulletin includes complete friction tables on types, valves, and fittings, and provides many handy conversion tables for every-day use.

Properties of over 100 common industrial liquids are listed.

(Data Bul #33 is issued by Blackmer Pump Co., 1809 Century Ave., S. W., Dept. PI, Grand Rapids, Mich.)
Circle 9512 opposite covers.

All about boiler feeding

Entire line of boiler feeding systems, deaerating systems, feed pumps, and accessories are described in detail in 20-page catalog.

A selection guide to help in answering the question "What kind of system is best for my plant?" is featured.

Numerous photographs, cutaway drawings, flow diagrams, charts and tables fully explain all details.

(Catalog 55-C is issued by Fred H. Schaub Engineering Co., Dept. PI, 2110 S. Marshall Blvd., Chicago 23, Ill.)
Circle 9513 opposite covers.

Card gives properties of stainless tubing

Technical data card gives specifications and properties on line of stainless tubing, pipe and welding fiittings.

Card includes data on high-temperature property of Croloy 16-13-3, its chemical composition, size ranges, and short time tensile and rupture properties.

(TDC-189 is issued by The Tubular Products Div., The Babcock & Wilcox Co., Dept. PI, Beaver Falls, Pa.)
Circle 9514 opposite covers.

Shows comparatively lighter gas turbine

Attractively illustrated, this 24-page booklet discusses a 500-hp gas turbine engine, whose applications are as a prime mover for mechanical drive, generator drive, air compression and others.

There are cutaway schematics, dimensional drawings, illustrations of applications, and performance charts.

("Jupiter" 500 hp turbine booklet is issued by Solar Aircraft Co., Dept. PI, 2200 Pacific Highway, San Diego, Calif.)
Circle 9515 opposite covers.

Control valves

Well illustrated 12-page booklet gives details on construction operating characteristics of complete line of control valves.

Bulletin points out how a combination of single-seated valve body and rugged cylinder actuator operate.

Optional accessories are illustrated, including a hand wheel operator, instructions for high and low temperature services, and a yoke-mounted pressure controller.

Complete specifications and valve sizing data are included.

(Bulletin LB-3 is issued by Conoflow Corporation, Dept. PI, 2100 Arch St., Philadelphia 3, Pa.)
Circle 9516 opposite covers.

Horizontal pumps for hot, cold water

Available in shaft-sealed types of 1½" to 4" discharge sizes and in packing-gland types of 4" to 8" discharge sizes, complete line of horizontal split-case pumps for hot and cold water handling are described in bulletin.

Capacity and head ranges of packing gland types are up to 2600 gpm up to 280 ft respectively, — capacity and head ranges of shaft-sealed types are up to 950 gpm at 350 ft.

Motor sizes range from 1 to 75 hp.

(Bulletin #B-2100 is issued by the Peerless Pump Div., Food Machinery & Chemical Corp., Dept. PI, 2005 Northwestern Ave., Indianapolis 8, Indiana.)
Circle 9517 opposite covers.

How to select a boiler

Discussing the packaged boiler vs the "built-in" boiler, twenty-page booklet generally tells how to select a boiler.

Full of photos and schematic drawings, the booklet covers other topics such as first cost vs operating costs, selecting the right fuel, space problems, boiler protection, and boiler design standards.

("How to Select a Boiler" is issued by Cleaver-Brooks Company, Dept. PI, 326 E. Keefe Ave., Milwaukee 12, Wisconsin.)
Circle 9518 opposite covers.

Electric wall heaters

Electric, fan-driven, wall-insert heaters are the subject of two-page bulletin.

Complete specifications and construction data on three units having capacities of 6824, 10,236 and 13,648 Btu/hr output are given.

(Bulletin 1101 may be obtained from Ilg Electric Ventilating Co., Dept. PI, 2850 N. Pulaski Rd., Chicago 41, Ill.)
Circle 9519 opposite covers.

HERE is your HORN

You designed it!

FEDERAL, custom tailored the **Vibratone** to your expressed wish and suggestions.

Now, you can have it!

Here is your horn that --

- fits any 4" sq. outlet box
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- has full-range volume control
- installs almost instantly
- is extremely compact
- has attractive appearance
- is durable, trouble-free

It's a new, modular design. Add simple accessories for flush mounting, or a projector type. Various wiring devices permit semi-flush, surface, concealed conduit, or weatherproof installations.

SPECIFY the new #350 **Vibratone** horn to your electrician, contractor or architect. It simplifies their problems, too.

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SIGN and **SIGNAL** Corporation

Circle 9520 opposite covers.

CAMBRIDGE GAS ANALYZERS

detect O_2 in FEED WATER

Continuous records of the oxygen dissolved in boiler feed water and of the hydrogen entrained in steam, indicate when corrective measures are necessary to prevent otherwise unsuspected and costly corrosion. Cambridge Analyzers measure and record dissolved oxygen directly. The hydrogen in the steam is measured and indicates the quantity of oxygen set free by dissociation. Cambridge Instruments are available for continuously recording either O_2 or H_2 separately, or O_2 and H_2 simultaneously.

Send for Bulletin 148 B. P.

CAMBRIDGE
INSTRUMENT CO., INC.
3550 Grand Central Terminal, New York 17, N. Y.
Pioneer Manufacturers of Precision Instruments

Circle 9521 opposite covers.

CUT HERE AND FILE

POWER PLANT & POWER SERVICES INDUSTRY

nomograph 18

Correcting draft gage readings for temperature

Data furnished by
TRIMOUNT INSTRUMENT CO.

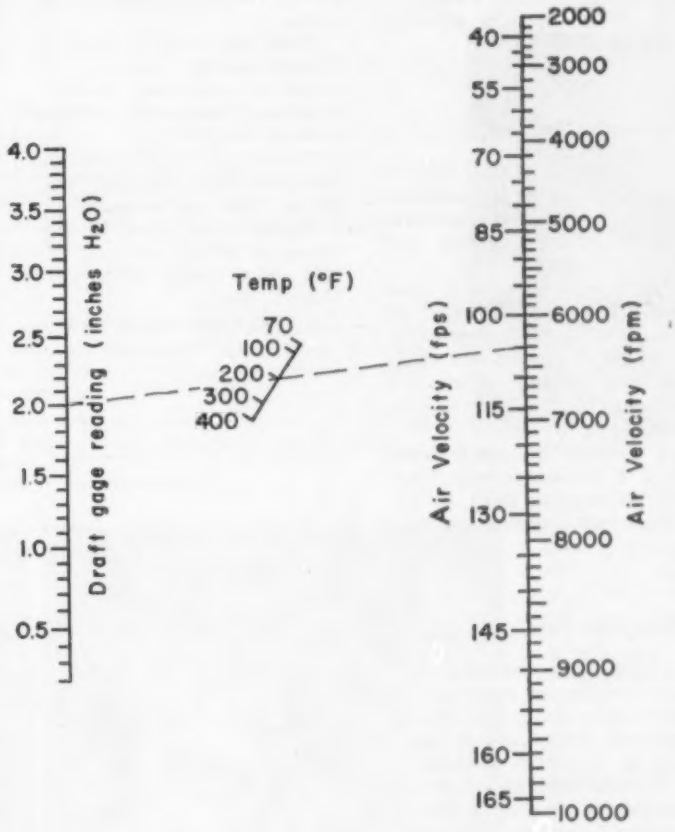
Nomograph by
STAFF OF PUTMAN PUBLISHING CO.

Draft gage readings of differential pressure elements of flowing gas streams must be corrected for gas temperature. This nomograph relates gage reading to air velocity and air temperature — permitting quick and accurate corrections for temperature.

Typical Example

If draft gage reads two inches of water and air temperature is determined at 200°F, what is the air velocity in feet per minute?

Connect 2.0 on draft gage reading scale with 200°F on temperature scale and read 6300 feet per minute on velocity scale — or in feet per second, 110.



Describes heavy-duty pump motors

Vertical hollow shaft motors from 1 to 700 hp, featuring heavy solid cast iron frames, sealed bearing chambers, metered oil flow and dual-end ventilation, are described in bulletin.

Vertical solid shaft motors are available in full range from 1 to 800 hp. The jet pump motor line, 1/3 to 2 hp, features a totally enclosed end-mounted starting switch, uniform windings and controlled ventilation.

Also included are horizontal fractional-hp motors, close-coupled pump and C-face motors, horizontal integral hp motors, TEFC and explosion-proof models.

(Bul MM-162 is issued by the Application Engineering Service, Electric Motor Division, Dept. PI, A. O. Smith Corp., Tipp City, Ohio.)
Circle 9522 opposite covers.

Synthetic belting

Six-page, fold-out bulletin tells story of an all-synthetic belting whose properties make it almost 100% elastic and free of stretch.

Belting is made of a combination of woven textile and flat ribbons of extruded nylon.

Bulletin contains table showing horsepower per inch of width for five types of belting.

("Texalon" bulletin is issued by J. E. Rhoads & Sons, Dept. PI, Wilmington, Del.)
Circle 9523 opposite covers.

Measures flow

Specifically designed for measurement of single or bi-directional flow, flow transducer is described and specified in four-page brochure.

Unit can accurately indicate, record and/or control flow of hydraulic abrasive fluids, slurries, acids, caustics, oils, fuels and any other fluid that can be safely contained in stainless steel.

Such details as range, pressure, temperature, frequency response, line sizes and materials are covered in general specifications section. Electrical information section covers input, output, resistance, and connector type used.

Featured is cross-section drawing, chart and technical data on operating principle.

(Mark V brochure is issued by the Ramapo Instrument Co., Dept. PI, 8 First St., Bloomingdale, N. J.)
Circle 9524 opposite covers.

Do it with lights

Lights are coded with color to identify exits and fire protection equipment; general aisles, traffic lanes and other safe through-passageways. They can also be used to identify stairs, curbings, dead ends, or other dangerous areas.

Units can also be used to identify specific operations in production lines, for differentiation, of plant areas, storage sections, etc.

Featuring a drop-design end-plate they are for 430, 800 or 1500 ma operation.

(Folder 2 is issued by the Edwin F. Guth Co., Dept. PI, 2615 Washington Blvd., St. Louis 3, Mo.)
Circle 9558 opposite covers.

"Oh, no! Not again this year..."

Catalogs cable trays and support systems

Eighty pages of diagrams, installation information and loading charts give full details on cable trays and support systems for all types of cables, wiring and tubing.

Channel size trays with expanded metal or solid bottoms and ladder type, in galvanized steel and aluminum, with appropriate fittings and accessories are included.

(Catalog #858 is isued by P-W Industries, Inc., Dept. PI, Duncan & Melrose Sts., Philadelphia 24, Pa.)
Circle 9525 opposite covers.

For long distance data transmission

Two-page specification sheet gives full details on high-speed, tubeless frequency-telemetering system for long-distance data transmission.

System is particularly applicable to power generation field and will transmit any variable that can be converted to an electrical signal.

(Specification S 301-1 is issued by Minneapolis-Honeywell Regulator Co., Dept. PI, Wayne & Windrim Aves., Philadelphia 44, Pa.)
Circle 9526 opposite covers.

Describes insulation for high-temp duty

For high-temperature insulation of boilers, ovens, ducts, headers, turbines, valves, piping, kettles, heat exchangers, storage tanks, four-page bulletin gives complete information on insulating cement.

Subjects covered include complete information on various grades, methods of application, recommended thicknesses and thermal conductivity ratings.

("Cominco" insulating cement bul is issued by United States Mineral Wool Co., Dept. PI, Stanhope, N. J.)
Circle 9527 opposite covers.

Slide rule selects Al strip conductor

Handy, logarithmic slide rule has been designed to aid in selecting dimensions of aluminum foil or sheet for use in strip-wound electrical coils.

Rule provides an easy means of converting from standard wire sizes in copper or aluminum to equivalent aluminum strip conductor.

Wire size is set on reference scale, and a wide range of equivalent strip conductor size combinations of width and thickness is shown on a selector scale.

(Slide rule is available from Aluminum Company of America, Dept. PI, 1501 Alcoa Bldg., Pittsburgh 19, Pa.)
Circle 9528 opposite covers.

Stainless steel heat exchangers

Described as fully standardized and mass-produced, series of stainless steel heat exchangers are described in four-page, illustrated bulletin.

Included are details on important features designed to assure maximum heat transfer, plus specifications on 19 models available in one-, two-, and four-pass design.

(Bul 301.6K1 is issued by American-Standard, Ross Heat Exchanger Div., Dept. PI, Buffalo, N. Y.)
Circle 9529 opposite covers.

Watertight concrete

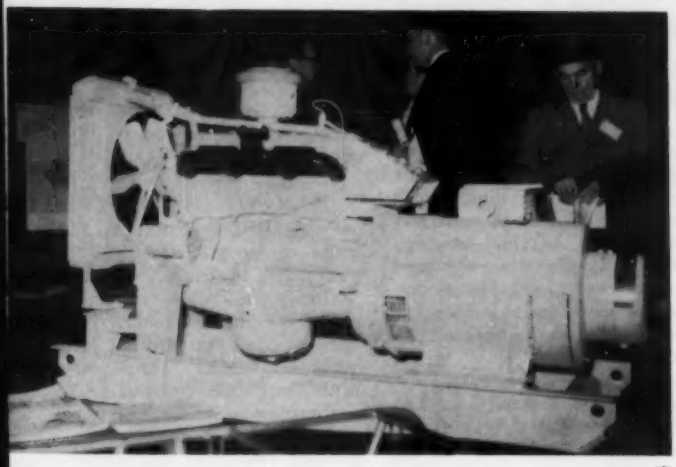
Factual summary of authoritative thought on design and specification of water tight concrete is given in six-page folder.

Discussion covers basic requirements for watertight concrete and how a chemical added to it reduces permeability, shrinkage, bleeding and segregation to produce strong, durable structural concrete.

(Code P-49B is issued by The Master Builders Co., Dept. PI, 7016 Euclid Ave., Cleveland 3, Ohio.)
Circle 9530 opposite covers.

PHOTO NEWS

Visits The 23rd National Power Show

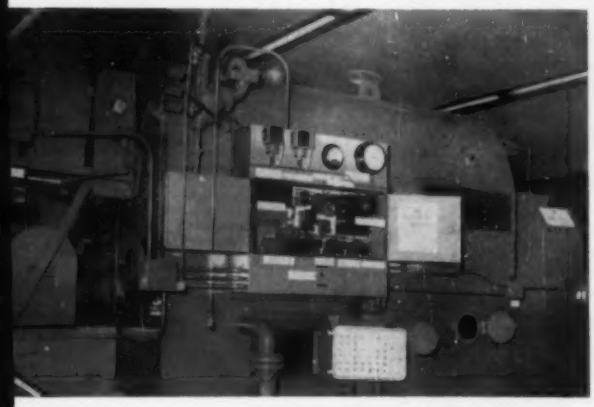


MERCEDES-BENZ DIESEL ENGINE powers this 30-kw electric generator set. Standard engine equipment incudes 24-v generator and starter, air cleaner, thermostat, Bosch fuel injection system, glow plugs, and instrument panel with tachometer. Generator includes voltage regulator and instrument panel for volt- and ammeter.

(Mercedes-Benz power generator is sold by Utica Division, Curtiss-Wright Corp., Dept. PI, Utica, Michigan.)
Check 9531 on Reader Service Card.

COMPLETE LINE of packaged water-tube boilers comes in capacities of 4000 to 13,000 lbs/hr. The 11 sizes, from 20 to 200 bhp, are complete packages with burner, controls, refractory, insulation and draft equipment installed and wired at the factory. Basic boiler is of horizontal, 4-pass, down-draft type.

(COMPACT boilers are manufactured by Superior Combustion Industries, Inc., Dept. PI, Times Bldg., New York, N. Y.)
Check 9532 on Reader Service Card.



COAL-FIRED PACKAGE boiler was developed by Bituminous Coal Research, Inc. The automatic, water-tube unit is combined with a water-cooled, pulsating coal burner. Available up to 300 bhp, units feature automatic coal feed and continuous ash removal.

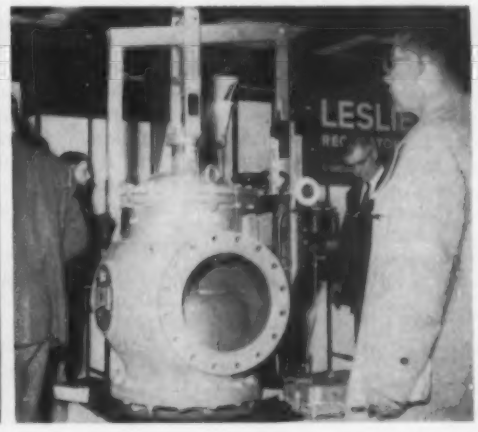
(Coal-pak boiler is manufactured by The International Boiler Works Co., Dept. PI, East Stroudsburg, Pa.)
Check 9533 on Reader Service Card.

SIMPLICITY OF DESIGN of 3½ ton, high-pressure feedwater heater closure was demonstrated by periodical disassembly and reassembly. Design which involves a few parts permits easy servicing.

(Feedwater heaters are manufactured by Ross Heat Exchanger Division, American-Standard, Dept. PI, Buffalo 5, New York.)
Check 9534 on Reader Service Card.

CONSTANT VOLTAGE SOURCE is used as reference (standard) voltage on this potentiometer recorder. In addition, null-balancing unit features plug-in components and convenient swing-out design for easy maintenance.

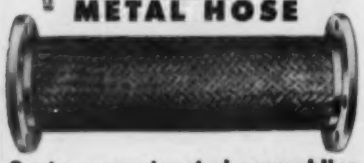
(Potentiometer recorders are manufactured by Wheelco Instruments Division, Barber-Colman Company, Dept. PI, Rockford, Illinois.)
Check 9535 on Reader Service Card.



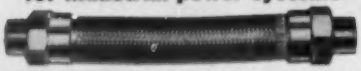
GIANT-SIZE CONTROL VALVE was highlight of Leslie Co.'s booth. This 16-inch, single-seated regulator handles throttling and dead-end service. Air-cylinder actuated, fully balanced and tight closing, the valve is designed for maximum inlet temperature of 500°F and maximum pressure drop of 100 psi.

(DBYCS control valve is manufactured by Leslie Co., Dept. PI, Grant Avenue, Lyndhurst, N. J.)
Check 9536 on Reader Service Card.

COBRA®
FLEXIBLE
SEAMLESS
METAL HOSE



Custom constructed assemblies for industrial power systems



All sizes in bronze, stainless or carbon steel, monel, inconel and low carbon nickel. Seamless spiral or parallel corrugation... Braided. All type of fittings and flanges welded, brazed or soldered. Also, interlocked hose.

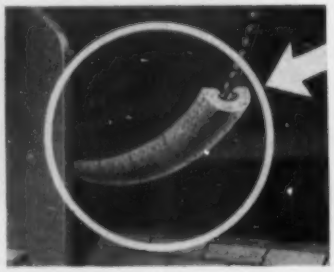
write — wire — phone: RE 7-3311
...for prices and catalogs

COBRA METAL HOSE

5039 S. Kedzie Ave. • Chicago 32, Ill.

Circle 9537 opposite covers.

In 2 hours you can add years to boiler life



It usually takes less than two hours to install a National Seam Protector. And this small job will avert failure of a riveted seam indefinitely.

No one can predict when the girth seam of a riveted HRT boiler will start leaking due to buckling of the outer lap. It's better to insulate the seam before the damage occurs, thus avoiding expense and hazard.

Ask us for complete information. Do it now while the subject is on your mind.

National Boiler Protector Co.
928 Reibold Bldg., Dayton 2, Ohio

Circle 9538 opposite covers.

NEW LITERATURE

LPG-air mixer

Package units that accurately mix propane or butane with air to supply stand-by fuel and maintain heating, heat processing and refrigerating operations are discussed in four-page bulletin.

Drawing showing a typical installation fully explains its automatic operation. Figures are included on three pressure ranges available for small, medium and large installations.

(Bulletin PD-1 is issued by the Selas Corporation of America, Dept. PI, Dresher, Pennsylvania.)
Circle 9539 opposite covers.

Discusses steel and alloy tank fabrication

Custom steel and alloy plate fabrications are pictorially presented in an 8-page brochure. Pictured are pressure vessels, tanks, large OD piping, field-erected breechings and stacks.

The custom fabrication of steel and alloy plate is in the 3/16" to 1¼" range.

(Catalog #958 is issued by the Missouri Boiler and Tank Co., Dept. PI, 2211 Papin St., St. Louis 3, Mo.)
Circle 9540 opposite covers.

Low-voltage DC power supply

Two-page catalog sheet illustrates and describes line of zero to 32-volt DC power supplies, with current ratings ranging from 5 to 40 amps.

Eight models are discussed for both rack and bench use.

All units are designed to operate from 115v AC, 60 cycles, single phase. Ripple is held to within ½ percent of the average DC output.

Detailed electrical and physical specifications for each model are included.

(Bulletin 102 is issued by the Opad Electric Co., Dept. PI, 69 Murray St., New York 7, New York.)
Circle 9541 opposite covers.

Water pumps

Giving detailed specifications, sectional view, selection table and outline dimensions, six-page, fold-out bulletin covers line of ball-bearing, horizontal split case, double-suction centrifugal pumps for general water service.

Capacities range from 500 to 5000 gpm.

(Bulletin #251 is issued by Warren Pumps, Dept. PI, Warren, Mass.)
Circle 9542 opposite covers.

Slide rule determines storage tank size

Handy, pocket-size slide rule calculator determines capacity and size of storage tanks.

Calculator furnishes information on tanks up to 100 ft high and 100 ft in diameter. Capacities are given in gallons, barrels and pounds of water.

Other information obtained with the calculator includes; decimal equivalents of a foot for all inch units and fractions; equivalent volumetric units; and steel plate weights for thicknesses from 3/16" to 1".

(Hammond Calculator is available from Hammond Iron Works, Dept. PI, 744 Broad St., Newark, N. J.)
Circle 9543 opposite covers.

"I just wanted to see if you were awake in there."

Weighted gage cocks for boiler safety

As effective aid to safe boiler operation, line of weighted gage cocks are described in two-page, illustrated circular.

Cocks feature renewable seats and discs, non-interference of lever, no stuffing box, reversible levers, and easy scale formation removal.

Circular gives instructions on installing, adjusting, renewing, reversing and replacing.

Cocks are available in two styles for pipe thread sizes ½" and ¾". Each is rated at 300 psi S.P.

(Circular #183 is issued by Lunkenheimer Co., Dept. PI, Box 360, Cincinnati 14, Ohio.)
Circle 9544 opposite covers.

Automatic control units for engine, compressor

Entitled "En-Tronic Pipeline Control," 14-page bulletin describes equipment for automatic starting, loading, capacity control regulating and shutting down pipeline compressors.

Equipment also applies to other types of power machinery such as gas, diesel and gas-diesel engines, as well as motor-driven reciprocating and centrifugal compressors.

(Bulletin #87 is issued by The Cooper-Bessemer Corp., Dept. PI, Mt. Vernon, Ohio.)
Circle 9545 opposite covers.

For heating, ventilating — automatic controls

Eight-page brochure describes and illustrates electric and electronic automatic control systems for heating, ventilating, and air conditioning.

Three important phases of automatic control system planning are analyzed: control centers, three basic types of control, and selection of power control system.

(Brochure F-8944 is issued by the Barber-Colman Co., Dept. PI, Rockford, Ill.)
Circle 9546 opposite covers.

Lighting information

Three bulletins present information on new lighting systems; area illumination, large element lighting, and overall illumination.

Information is included on the most important features, plus mounting details, lighting characteristics, different shielding media available, overall dimensions and ordering information.

(The forms #800C, 610B, and 620-7-58 are issued by Smithcraft Lighting, Dept. PI, Chelsea 50, Mass.)
Circle 9547 opposite covers.

Welding fittings — revised data

Complete data on stainless-steel welding fittings and flanges is the subject of a 54-page booklet, revised to reflect recent code changes and to conform with new code interpretations for types 304L and 316L stainless steel.

Data for allowable S-valves, allowable working pressures of fittings, pressure-temperature rating of flanges and corrosion resistance are included.

(Catalog TT600 is issued by Tube Turns, Division of Chemetron Corporation, Dept. PI, Louisville 1, Ky.)
Circle 9548 opposite covers.

Two-way pneumatic control valves

Two-page bulletin describes and illustrates a two-way air control valve.

Bronze valve is used with air-operated hydraulic lifts, hoists, and other industrial air-operated equipment. It provides positive control, quick response and maximum safety.

Valve is manufactured with or without hold-open feature.

(Bulletin F-44 is issued by the Jordan Corporation, Industrial Sales Division of OPW Corporation, Dept. PI, 6013 Wiehe Rd., Cincinnati 13, Ohio.)
Circle 9549 opposite covers.

Industrial fans

Describing expanded line of industrial and commercial fans, four-page bulletin lists 42 low-pressure fans and 50 high-pressure fans, giving fan speed, motor horsepower, quietness rating and net weight.

Included is a chart which explains significance of different quietness ratings.

Installation drawings are provided together with a table of dimensional data for the full line.

(Bul 8914 is issued by American Blower Division of American-Standard, Dept. PI, Detroit 32, Mich.)
Circle 9550 opposite covers.

Indoor and outdoor switchgears

Complete line of indoor and standard walk-in outdoor type equipment with ratings through 3000 amperes continuous current and 350-mva interrupting capacities is subject of 24-page bulletin.

Outdoor walk-in switchgear is described in a separate section.

The two-color bulletin is illustrated with photographs, sketches, diagrams and drawings. Included are charts and tables for detailed listings. Ratings and dimensions are also included.

Schematic drawings, dimensions, preferred locations and arrangements of various circuit elements for indoor and outdoor type equipment are covered in separate sections.

(Bulletin No. 2804-1A is available from I-T-E Circuit Breaker Co., Dept. PI, 1900 Hamilton St., Philadelphia 30, Pennsylvania.)
Circle 9551 opposite covers.

For more information on items reported in the New Literature section circle corresponding numbers on reader service card opposite inside covers.

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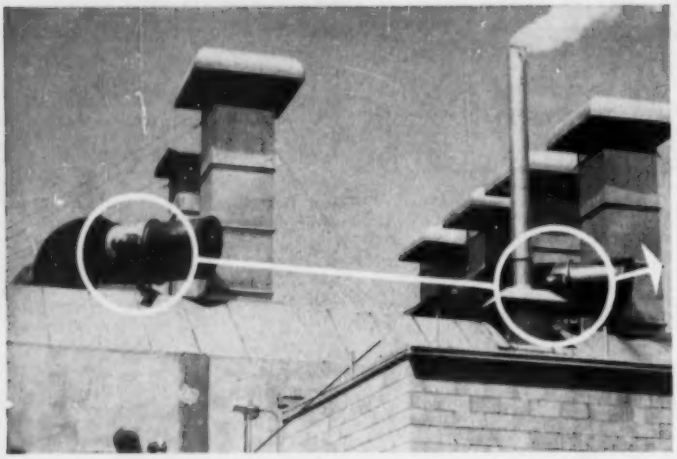
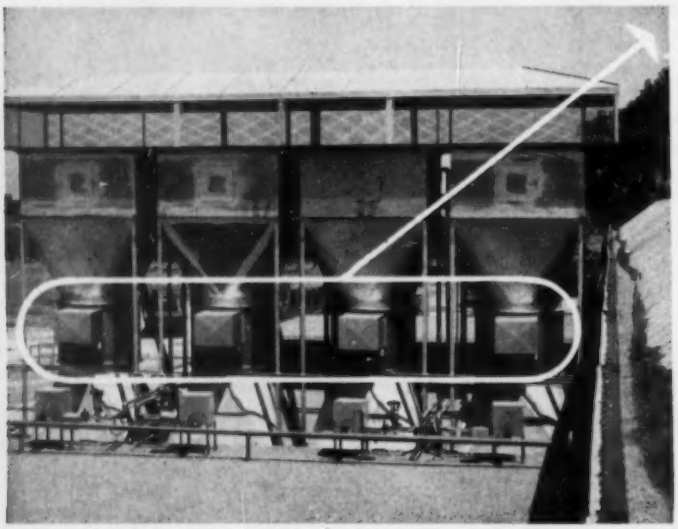
SOUTHEASTERN STATES, Joe H. Howell, 40 Peachtree Place, N.W., Atlanta 9, Georgia, TRinity 2-2235

Hartzell belt-drive duct fans withstand heat and moisture

to keep production lines rolling at California Vegetable Concentrates, Inc.





The fan or blower which does an adequate job under routine operating conditions won't necessarily stand up when the going gets tough. Hartzell air moving equipment is designed and built with a plus capacity that allows it to take rough jobs in stride.

Typical of the unusual jobs which are a natural for Hartzell fans and blowers are these installations at California Vegetable Concentrates, Inc., Modesto, Cal. The top photo shows two of the five 44", 3 h.p. Hartzell belt-drive duct fans which exhaust 26,200 cfm of hot, wet air from a belt-type continuous vegetable dehydrator.

The lower photo shows four 48", 10 h.p. Hartzell belt-drive duct fans which supply heated air for a tunnel-type dryer. Each of these fans moves 30,800 cfm thru a gas fired heater (shown at the top of the stack). These fans are exposed not only to the high temperature of the entering air but to extreme radiant heat from the burners themselves.

Fan failure here would cripple the entire operation, but the customer reports that in 15 months of operation these fans have required only a minimum of routine maintenance. No damage due to heat or moisture has yet been detected.

For specific recommendations on how rugged, reliable Hartzell fans and blowers can help you solve your air moving problems, get in touch with your nearby Hartzell field engineer. If you don't know him, drop us a line for his name and address.

These installations were handled by the Hartzell field office at Santa Clara, California; P. O. Box 144, phone Cherry 3-3217.

here's a complete line of air moving equipment designed and built specifically for industry

Propeller Fans • Duct Fans • Vaneaxial Blowers • Man Coolers • Centrifugal Blowers • Roof Ventilators • Adjustable Pitch Fans • Intake Units

HARTZELL PROPELLER FAN COMPANY • 53 Thomas Blvd. Piqua, Ohio
Division of Castle Hills Corporation
Engineering Offices in Principal Cities

Circle 9552 opposite covers.

NEW LITERATURE

Over 2000 connectors for flexible metal hose

Over 2000 standard model of flexible metal hose connectors is illustrated, described and individually pictured in 16-page catalog.

Included in the catalog is recently introduced line of weld heat connectors.

All models are available in steel, stainless steel, Monel and nickel.

Sizes ranges from ¼ inch inside diameter to 8 inch ID.

(Catalog #658 is issued by Cobra Metal Hose, Dept. PI, 5059 S. Kedzie Ave., Chicago 32, Illinois.)

Circle 9553 opposite covers.

How to protect boiler seams

Illustrated two-page bulletin shows how sealing protectors are installed to give HRT boilers increased life expectancy.

Seam protectors are made of high refractory tile constructed to form close-fitting joints over boiler seams that have been caulked or patched.

Method of installation is illustrated.

("Protect the Seam and Save the Boiler" is issued by National Boiler Protector Co., Dept. PI, Reibold Bldg., Dayton, Ohio.)

Circle 9554 opposite covers.

"He says it tastes better than regular drinking water."

THAT'S INTERESTING

mproved process for Al-covered steel wire

Process for producing aluminum-covered steel wire gives wire the strength of steel along with high conductivity and corrosion resistance.

Copperweld Steel Company, who sponsored research program at Battelle Memorial Institute, has not released information on the process except that aluminum is added to steel rod and bimetallic rod is drawn into wire.

Apparently, aluminum covering may now be applied to a thickness not previously possible by dipping wire in a bath of molten aluminum. Heavier aluminum layer greatly increases electrical conductivity.

Continuous process, which lends itself to automation, produces a coating that is remarkably uniform. Aluminum and steel are joined by a strong, ductile metallurgical bond.

Wire is to be marketed under trade name of Alumoweld.

or peak loads?

An increase in power output from zero to 530,000 thermal kw in less than a second has been accomplished in a KEWB (Kinetic Experiment in Water Boilers) reactor. After increase, reactor shut itself off without sustaining any damage.

For figuring purposes, this rate of power increase amounted to tripling the power every two-thousandths of a second. Only moderate pressure lasting for one-thousandth of a second was generated within reactor vessel.

Reactor was built for AEC by Atomics International.

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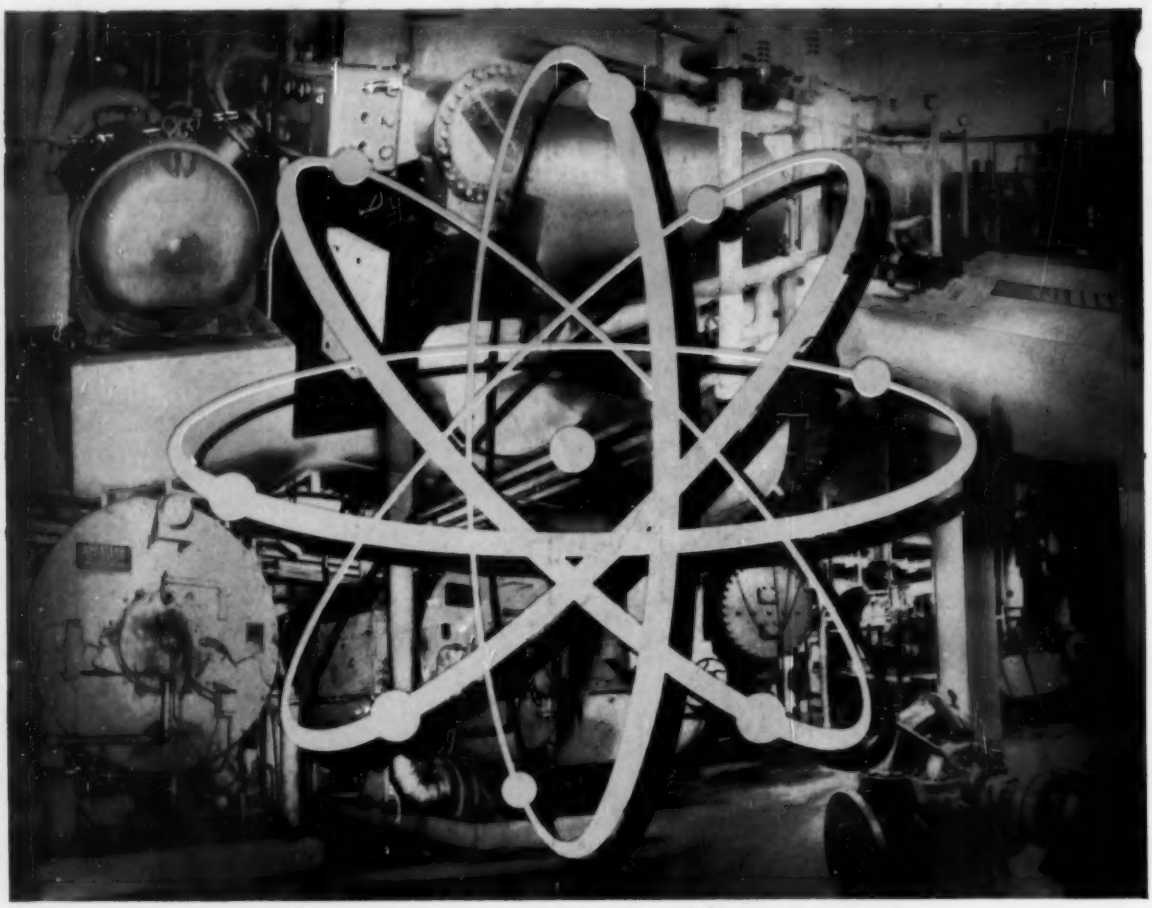
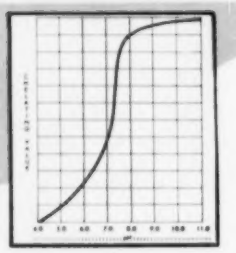


MOGUL *Chelating adds another BIG plus to plant water treatment



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